Appendix D
Economics Technical Appendix

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Appendix D

This technical appendix describes the analytical framework, methods, and data used to conduct the economic analysis for the Final Programmatic Environmental Impact Statement (FPEIS). The conceptual basis for analyzing the economic effects of salmon harvest and protection programs has been reviewed extensively in the literature, including several recent studies concerning the Columbia and Snake Rivers (U.S. Army Corps of Engineers (Corps) 1995, 1999; Huppert and Fluharty 1996). Drawing from this literature, this appendix describes some of the key principles that underlie the economic analysis, in addition to describing in greater detail than in the EIS the methods and data used in the analysis.

Following this brief introduction, relevant economic concepts for the analysis are described, followed by a description of the analytical approach and assumptions used for the study and a discussion of key measurement issues, including the treatment of salmon supply effects on price and the validity of net income coefficients used in the analysis. The methods and data used to estimate economic effects in each of the three study regions are then described. Worksheets used to conduct the quantitative analyses also are included.

D.1 Relevant Economic Concepts

A frequently used definition of economic analysis is the study of the processes by which scarce resources are (or might be) allocated to achieve competing objectives. For this study, the scarce resources being considered are listed salmonid species and the competing interests are the various users of the fish resources that are both directly and indirectly affected. Because, from an economic perspective, all resources are scarce with price an indicator of their relative scarcity, choosing to use a resource one way means choosing not to use it another way. Potential benefits foregone by the choice to use a resource in one way rather than another are referred to as opportunity costs. Consequently, every choice that is made costs something, even if the best choice is made. In the case of the proposed actions, choices must be made from among the project alternatives and, at a minimum, the cost of the choice made will be the foregone benefits of other uses of the resource that are not complimentary to the selected management approach. (Budgetary costs, such as government expenditures to implement an action, represent a portion of the opportunity costs because they reflect the costs of resources used directly in a project.)

This economic analysis focuses on evaluating two kinds of effects: 1) changes in resource costs and benefits, and 2) changes in regional economic activity. Analysis of resource costs and benefits attempts to measure the change in social welfare or value to producers and consumers, which forms the basis for benefit- cost analysis. As described in the Water Resource Council's *Principles and Guidelines*, this type of analysis is referred to as a National Economic Development evaluation because it focuses on changes in the social welfare of the nation (i.e., the economic efficiency of allocating scarce resources). For this type of analysis, value to consumers can be measured in terms of their willingness-to-pay (WTP) for a change in resource allocation, whereas value to producers can be approximated by the change in net income or profits.

In quantifying resource costs and benefits, dollar values are assigned to the quantities of goods and services available both with and without a proposed action. The first step in this quantification is to determine the quantity of goods and services to be affected. The second step is to assign a value based upon the consumer's WTP for an increase or decrease in the goods and services. For goods sold in competitive markets, the WTP for the quantity supplied equals the area under the market demand curve for the good. Because consumers pay the market price for each unit, the total expenditure is price multiplied by quantity. The consumer surplus is the total WTP minus the actual payments. A reduction the quantity available causes an increase in market prices and reduces the consumer surplus, making consumers worse off than before. For goods and services typically not sold in competitive markets or sold at prices that do not reflect the cost of production, such as sport fishing opportunities, economic value can be determined using price-like information from surveys.

Producer surplus is the amount that commodity producers are paid (again, price times quantity) minus the cost of producing that quantity. In practice, producer surplus is reflected in profits to businesses and rents earned by owners of land, owners of permits in limited entry fisheries, or other scarce natural resources (e.g., water and minerals). The supply curve in a competitive market is equivalent to the marginal cost of producing and selling the good. Any point on the supply curve represents a price (on vertical axis) at which sellers would willingly sell a given quantity (horizontal axis). The upward slope on the supply curve means that in order to induce sellers to provide an additional amount, the price must be increased slightly. The area under the supply curve between the origin (zero quantity) and the actual quantity supplied is a measure of the total cost of producing that quantity. Finally, because producer surplus is the amount producers are paid minus the cost of production, producer surplus is depicted as the area over the supply curve and below the price.

Some people derive value from certain resources without ever using them. For example, individuals may be willing to pay some amount of money to preserve their option to use a resource at some later date. This value, which is called "option value," is a value over and above the consumer surplus because these people are not included in the market demand curve. This option is important if there is some possibility that the resource, such as listed or endangered species, will not be available at some time in the future. In addition to option value, some individuals are willing to pay an amount of money just to know that the resource exists, even if they have no intention of ever using it. This value is known as existence value and willingness to pay to protect national treasures such as the Grand Canyon is an example of it. Lastly, some people are willing to pay something to ensure that a unique resource is available for future generations to enjoy, which is referred to as bequest value.

Different analytical frameworks can be used to present resource costs and benefits for decision-making. Deciding on the appropriate framework often depends in large part on the availability of data to conduct the analysis. Cost-effectiveness analysis can be used when a specific project outcome is predetermined and the analytical objective is to determine the least cost way to achieve the objective. Economic costs are derived in terms of the opportunity costs of foregone alternatives, including any direct costs

incurred by implementing agencies. In cases where the alternatives have different outcomes such as biological effectiveness, then incremental cost-effectiveness can be used to select the least cost and most effective alternative.

A more comprehensive approach that involves equal consideration of economic costs and benefits is benefit-cost analysis. Benefits reflect the increased value of market goods and services and non-market goods and services (e.g., recreational, aesthetic, and cultural values). Benefit-cost analysis is commonly summarized in the form of a ratio, with a ratio of one or higher indicating the economic advisability of an alternative.

The successful application of either cost-effectiveness or benefit-cost analysis depends on the existing scientific understanding of the underlying physical and biological processes. If these processes and key relationships are not well understood, then the economic analysis will mirror (and often compound) this level of uncertainty.

Regional economic analyses measure changes in economic activity within a specified geographic region stemming from changes in within-region expenditures. This type of analysis, which is referred to as a Regional Economic Development (RED) evaluation in the Water Resource Council's *Principles and Guidelines*, typically includes the initial direct effect of a change in expenditures plus the secondary indirect and induced multiplier effect (indirect impacts on input industries and induced impacts from household spending of labor income). The regions for the regional economic impact analyses are based on those counties where the direct impacts are expected to occur.

Why analyze both resource costs and benefits and regional economic impacts? Typically, it is important for federal agencies to conduct nationally oriented benefit-cost analyses in an attempt to maximize net benefits to society. Reviewing each alternative's effect on societal net benefits (e.g. total benefits minus costs) is often used as a decision criterion. Despite their more local orientation, regional analyses are still relevant. Regional analyses provide valuable information as to the significance of impacts to a regional economy. Decision-makers need to know the impact of a project on a regional economy to avoid creating either significant negative impacts for a region with a limited economic base or extreme positive impacts that could generate extensive growth inducing effects. Regional economic impacts are more associated with in-region expenditures, whereas consideration of resource costs and benefits measure potential changes in social welfare

D.2 Analytical Approach and Assumptions

As previously indicated, evaluation of changes in resource cost and benefits or regional economic activity requires a baseline from which these effects are measured. The baseline for this analysis of alternatives is Alternative 1, which also serves as the No-Action Alternative under NEPA. This status quo condition, however, is not an historical account of harvest and effort but reflects how conditions during particular historical periods (1988 through 1993 [Baseline 1] and 1994 through 1997 [Baseline 2]) would be different if current (i.e., status quo) management policies were in effect.

With Alternative 1 as a baseline, the costs and benefits of the study alternatives can be generally viewed in terms of two potential actions that are consistent with the need and purpose for action:

Action 1: Allocate more fishery resources for harvest using a mark selective approach while still meeting or exceeding conservation objectives (Alternative 2).

Economic (Opportunity) Costs

- Lost opportunities from allocating governmental budgetary resources away from other programs
- Foregone incremental benefits of expedited recovery of listed species, including the benefits of relaxing regulations on resource users such as commercial and sport fishing interests, hydropower interests, and land developers
- Increased risk of extinction

Economic Benefits

- Increased near-term value to commercial harvesters, processors, anglers, and fishing-related businesses as measured by their willingness to pay for these changes (consumer and producer surplus)

Action 2: Allocate more fishery resources to recovery by restricting or banning fishing (Alternative 3—No Incidental Take)

Economic (Opportunity) Costs

- Foregone benefits to commercial harvesters, processors, anglers, and fishing-related businesses from reduced harvest and effort in the near-term

Economic Benefits

- Increased value to resource users (producers and consumers) over the long term associated with a more rapid relaxing of government regulations that restrict different activities (e.g., fishing, generating hydroelectric power, developing land)
- Value to the public associated with changes (expected improvements) in the status of listed species

A formal benefit-cost analysis of these effects could not be conducted for several reasons. First, important components of costs and benefits, such as the value that public places on changes in the status of listed species and potential changes in consumer surplus associated with changes in the supply of salmon (see discussion below), could not be estimated reliably with existing data and available resources. Second, for those effects that can be quantified, the level of uncertainty associated with the estimates is believed to be relatively large. Last, there is considerable uncertainty about the scientific basis for predicting biological (and economic) effects over the long-term (i.e., period of recovery and beyond).

As a consequence, a more hybrid analysis that includes a comparative assessment of changes in some of the key economic measures, such as net income to producers, WTP by anglers, and personal income in the local/regional economy, is conducted. This type of analysis, which is consistent with the intent of NEPA for comparing alternatives, is intended to provide decision-makers with insight into the relative magnitude of some of the predicted economic changes associated with the different alternatives. Because the analysis adopts a "snapshot" approach of potential effects that are near term in nature, it does not take into account adjustments that would be made over time by affected interests (e.g., harvesters, anglers, and communities).

In addition to evaluating changes in the key economic parameters identified above, potential effects on the personal income of sport fishing-related businesses are considered. Although, from a social welfare and regional economic perspective, these effects would be mostly offset by spending-related changes in other businesses because it is assumed that competitive markets exist with unconstrained entry and exit, they are evaluated in this study because some of the affected businesses rely extensively on angler spending for their revenues. Consequently, predicted changes in revenues and net income to sport-fishing related businesses are presented to highlight potentially significant distributional effects on this directly-affected business sector.

Key assumptions that underlie the economic analysis of the project alternatives include the following:

- All dollar values are expressed in constant 1996 dollars.
- The period of analysis is indeterminate, with quantitative changes in resource costs and benefits and regional economic activity being near-term, and more qualitative effects related to recovery of listed species being longer term.
- The accounting stance (i.e., geographic region of study) is at the state level for evaluating changes in resource cost and benefits and at the county (borough level in Southeast Alaska) or multi-county level for evaluating changes in regional economic activity.
- Economic effects that are quantified are presented as annual impacts.
- The analysis of changes in resource costs and benefits assumes a full employment economy in which all resources have alternative uses (i.e., opportunity costs).

D.3 Measurement Issues

Two important measurement issues for the analysis are how potential changes in the harvest and supply of salmon affect the price (and consumer or producer surplus) of salmon, and how predicted changes in harvest and angler effort affect the net income of directly-affected businesses (i.e., commercial salmon harvesters and businesses that sell goods and services to salmon anglers). Treatment of these two issues for the analysis is discussed in this section.

D.3.1 Supply Effects on Price and Consumer Surplus

Implementing any of the proposed alternatives would result in a change in the harvest of Pacific salmon, mostly chinook salmon that is considered high-valued. For some of the alternatives, such as Alternative 2—Reduce Chinook Nonretention Fisheries in the Southeast Alaska study area, the change in annual harvest would be relatively small (i.e., a decrease of 7,000 Chinook salmon out of a total harvest of 274,000 under the 1988-93 baseline). Other alternatives, however, such as Alternative 3—No Incidental Take for the Pacific Coast, would result in a more substantial change in harvest (a reduction of 814,000 chinook salmon and 60,000 coho salmon for Baseline 1).

The effect on the price of salmon from a change in Pacific salmon landings has been studied extensively (Boyce 1990; Boyce et al. 1993; Mittelhammer et al. 1990; Herrmann 1993; Hydrosphere 1991; and Hanemann 1986). Study results are varied, reflecting in part the different magnitudes of supply changes studied. Hanemann (1988) suggests that there would be no price effect from a 0.5 percent reduction in the harvest of Sacramento-San Joaquin River systems because it is assumed that "[California] consumers face a horizontal supply curve for salmon, and any reduction in Sacramento River salmon is made up by increased supplies of out-of-state fish." Based on econometric studies, Boyce (1990) found that the harvest of Alaska salmon had an insignificant effect on price (i.e., the coefficient on price was not significant).

Studies conducted by Mittelhammer et al. (1990) and Hydrosphere (1991) indicate that changes in the supply of Pacific salmon would have varying effects on the ex-vessel price of salmon. Using an international trade model for salmon, Mittelhammer evaluated the price effects of a 10 percent change (both increases and decreases) in landings of high-valued Pacific salmon. He estimated that a 10 percent increase in landings would result in a 3.8 percent reduction in the ex-vessel price of high-valued salmon, and that a 10 percent decrease in price would result in a 4.4 percent increase in ex-vessel price.

Using results from ordinary least squares regression analysis of the price of California Chinook salmon between 1980 and 1989 as affected by the catch of salmon in California, the supply of farmed salmon, and the supply of wild salmon from areas outside of California, Hydrosphere (1991) evaluated the effects of designating critical habitat for Winter-Run Chinook Salmon in the Sacramento River. They estimated that a 4.5 percent increase in salmon landing would result in a 0.8 percent decrease in the ex-vessel price of chinook salmon landed in California. This reduction in price translated to $0.02 per pound based on an assumed average price of $2.41 per pound.

For this study, resources are insufficient to conduct a rigorous evaluation of potential effects of changes in salmon harvest on price. The complexities of different markets (Alaska, Pacific Coast, and Columbia River basin) and project alternatives with differing magnitudes (and directions) of supply changes would make a quantitative analysis of potential price effects very challenging; however, based on review of the literature cited above, it does appear that changes in salmon harvest, particularly relatively large changes that would be associated with implementing Alternative 3 in

all three areas, would affect the ex-vessel price of salmon. This effect, in turn, would result in a change in consumer or producer surplus.

D.3.2 Net Income Coefficients

Coefficients are used in the analysis to estimate the net income received by commercial salmon fishers and sportfishing-related businesses associated with potential changes in sport and commercial salmon harvests. The following sections describe these coefficients and assess their validity for the analysis.

D.3.2.1 Commercial Fishing Net Income Coefficients

For the Southeast Alaska, the net income (profits) to commercial fishers was estimated based on a net income coefficient of 0.426, which was derived from information from a study of the sockeye fishery in Cook Inlet (ISER 1996). For the Pacific Coast and Columbia River study areas, a net income coefficient of 0.40 was used. This coefficient represents the midpoint of a range of commercial fishing proprietary income coefficients from the 1992 IMPLAN database for fishery regions between Monterey, California, and the Oregon/Washington border.

Net income coefficients (i.e., the proportion of ex-vessel revenue retained by vessel owners as profit) can vary considerably across regions and from year to year because of differences in harvested salmon species, vessel sizes, gear types, salmon prices, harvesting efficiencies, and other factors. Coefficients can also vary substantially depending on whether the coefficient represents average profits (i.e., profits derived from the total harvest) or marginal profits (i.e., profits derived from the harvest of additional salmon).

A comparison of net income coefficients cited in a number of fishery studies is presented in Table D-1. As shown, marginal net income coefficients range from 0.68 to 0.99, whereas average net income coefficients range from 0.07 to 0.54. The discrepancy between average and marginal coefficients is primarily explained by the underutilized capacity of the commercial salmon fishing industry, which allows the industry to accommodate an increase in catch with relatively little increase in cost. The differences in average and marginal coefficients tend to shrink when the change in harvest becomes large. One study (Hanemann 1986) indicates that large salmon trollers earn greater average profits than small trollers, as indicated by a net income coefficient of 0.530 for large trollers and 0.389 for small trollers. Over the long run, investment in the fishing fleet is induced by short-run profits resulting from increased availability of harvest, causing costs to increase and reducing net income.

As Table D-1 shows, regional variations in net income coefficients appear to exist, although the variations do not appear to be large. The Washington fishery, however, may exhibit structural differences that could result in a lower net income coefficient, based on the findings of a study prepared by the Washington Community Development Department (1988). According to this study, the net income coefficient for salmon fishing using all gear types averaged 0.073, indicating that a relatively large percentage of Washington landings may be attributable to smaller, less-efficient boats operated on a part-time basis. This relatively low net income coefficient is not

supported by other studies, which indicate that long-term average coefficients for Washington are in the 0.400 to 0.490 range (Table D-1).

The use of the 0.426 coefficient for Southeast Alaska and the 0.40 coefficient for the Columbia River basin and Pacific Coast appears to be reasonable based on the net income coefficients presented in Table D-1. The use of these coefficients, however, has probably resulted in conservative estimates of net income for the project alternatives given the higher marginal income coefficients shown in Table D-1.

Table D-1. Comparison of net income coefficients for the commercial fishing sector used for other studies of fishery changes.

Area	Net Income Coefficient	Type of Coefficient	Source
Alaska	0.360	Average. All commercial species, Southeast Alaska	Hartman 1999.
	0.427	Marginal. Driftnet. Kenai River sockeye salmon.	Institute of Social and Economic Research 1996.
	0.685	Marginal. Setnet. Kenai River sockeye salmon.	Institute of Social and Economic Research 1996.
Washington	0.073	Average. All gear types, salmon, statewide.	Washington Community Development Department 1988.
	0.370	Average. All commercial species, statewide.	Hartman 1999.
	0.400	Average. Troll, three-year average.	Huppert and Fluharty 1995.
	0.490	Average. Troll, ten-year average.	Huppert and Fluharty 1995.
Columbia River basin	0.250	Average. All gear types, salmon.	Washington Community Development Department 1988.
	0.280	Average. Gillnet, three-year average.	Huppert and Fluharty 1995.
	0.540	Average. Gillnet, ten-year average.	Huppert and Fluharty 1995.
Oregon	0.150	Average. Troll, from a representative budget.	Carter and Radtke 1986.
	0.340	Average. Troll, three-year average.	Huppert and Fluharty 1995.
	0.530	Average. Troll, ten-year average.	Huppert and Fluharty 1995.
California	0.389	Average. Small salmon trollers.	King and Flagg in Hanemann 1986.
	0.530	Average. Large salmon trollers.	King and Flagg in Hanemann 1986.
	0.750	Long-run marginal. Chinook salmon.	Hydrosphere 1991.
	0.900	Short-run marginal. Chinook salmon.	Hanemann (1986) and Meyer Resources (1985) in Hydrosphere 1991.
British Columbia	0.85-0.99	Marginal. Troll salmon. Small changes in catch to a doubling of catch.	Barclay and Morley (1980) as cited in Meyer Resources 1985.
Pacific Coast	0.500	Average. Troll salmon.	Rettig and McCarl (1985) in Pacific Fishery Management Council 1999.
	0.900	Marginal. California, Washington, and Columbia River salmon species.	Various studies cited in Meyer Resources 1985.

D.3.2.2 Sport Fishing Net Income Coefficients

For the three study areas, a coefficient of 0.116 was used to estimate the amount of net income generated for sport fishing-related businesses. This coefficient was derived from data on proprietary income in the 1992 IMPLAN database for Clatsop County, Oregon.

The 0.116 net income coefficient was a weighted average of the individual coefficients for five sport fishing-related sectors: food stores, eating and drinking establishments, service stations and fuel, hotels and motels, and miscellaneous retail trade.

The appropriateness of using this coefficient to estimate net income within the three study areas was evaluated by comparing it to net income coefficients for major port areas in Oregon and California that were derived using the same procedures. The resulting coefficients are as follows.

- Tillamook: 0.130
- Newport: 0.113
- Coos Bay: 0.106
- Brookings: 0.118
- Crescent City: 0.112
- Eureka: 0.107
- Fort Bragg: 0.103
- San Francisco: 0.085
- Monterey: 0.097

As these net income coefficients demonstrate, the coefficients do not vary considerably across the major port areas. Consequently, the 0.116 net income coefficient was considered to be reasonably representative of coefficients for sport fishing-related businesses within the three study areas. It should be noted that, as indicated above, the estimates of net income to sport fishing-related businesses should not be viewed as a measure of welfare (producer surplus) changes because the changes in net income to these businesses would be generally offset by changes in net income to other businesses as angler expenditures are redirected.

D.4 Region-Specific Methods and Data

The methods and data used to evaluate impacts in each of the three study areas (Pacific Coast, Southeast Alaska, and Columbia River basin) are described below.

D.4.1 Southeast Alaska

The analysis of Alternative 2—Reduce Chinook Nonretention Fisheries, identifies economic effects from potential reductions in the chinook harvest associated with eliminating the chinook non-retention fishery in favor of a mixed-stock fishery opening at a later time. Alternative 3—No Incidental Take, assumes that there would be no commercial troll fishing or sport fishing in marine waters for salmon.

D.4.1.1 Salmon Sport Fishery

Natural Resources Consultants (NRC) developed estimates of harvest and sport fishing effort (trips) by alternative for different areas (e.g., Ketchikan, Prince of Wales, etc.) in Southeast Alaska (Table D-2). The annual number of sport fishing trips was estimated

Table D-2. Resident and non-resident salmon angler days, by port area.

Angler Trips in Saltwater (regardless of target)
and harvest of Salmon

		Base			1988-1993					1994-1997				
Port	Data	88-93	94-97	Grand Total	Days Fished	Resident Days	Non-Resident Days	Resident Salmon Days	Non-Res Salmon Days	Days Fished	Resident Days	Non-Resident Days	Resident Salmon Days	Non-Res Salmon Days
Glacier Bay	Average of Trips	8105	12410	9827	12401	6486	5915	3775	2816	18987	9930	9057	5779	4311
	Average of Chinook	873	1369	1071										
	Average of Coho	2019	3887	2766										
	Average of Sockeye	133	231	172										
	Average of Pink	1872	1710	1808										
	Average of Chum	168	227	192										
Haines-Skagway	Average of Trips	7175	5794	6623	10978	5741	5236	3341	2493	8864	4636	4228	2698	2013
	Average of Chinook	415	435	423										
	Average of Coho	250	195	228										
	Average of Sockeye	118	23	80										
	Average of Pink	1413	482	1041										
	Average of Chum	25	37	30										
Juneau	Average of Trips	91105	94411	92427	139390	72901	66489	42428	31649	144448	75547	68902	43968	32797
	Average of Chinook	11183	11922	11479										
	Average of Coho	32745	35690	33923										
	Average of Sockeye	766	605	702										
	Average of Pink	16580	11871	14697										
	Average of Chum	2929	4392	3514										
Ketchikan	Average of Trips	54837	52644	53960	83901	43880	40021	25538	19050	80545	42125	38420	24517	18288
	Average of Chinook	8718	4156	6893										
	Average of Coho	20215	31062	24554										
	Average of Sockeye	1016	1432	1182										
	Average of Pink	17871	21678	19394										
	Average of Chum	1382	3900	2389										
KPWS*	Average of Trips	33018	30511	32015	50517	26420	24097	15377	11470	46682	24415	22267	14209	10599
	Average of Chinook	6232	4175	5409										
	Average of Coho	3141	6335	4419										
	Average of Sockeye	362	503	419										
	Average of Pink	993	788	911										
	Average of Chum	190	213	199										
Prince of Wales Is.	Average of Trips	21511	30845	25245	32912	17213	15699	10018	7473	47193	24682	22511	14365	10715
	Average of Chinook	4754	6771	5561										
	Average of Coho	16604	25455	20144										
	Average of Sockeye	375	783	538										
	Average of Pink	5546	7639	6383										

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Table D-2. Resident and non-resident salmon angler days, by port area.

	Average of Chum	308	936	559											
Sitka	Average of Trips	46773	62247	52963	71562	37427	34135	21783	16248	95238	49809	45428	28989	21624	
	Average of Chinook	9115	17919	12637											
	Average of Coho	8595	32991	18354											
	Average of Sockeye	1181	1906	1471											
	Average of Pink	3013	6429	4379											
	Average of Chum	839	3015	1709											
Yakutat	Average of Trips	2956	4663	3639	4523	2365	2157	1377	1027	7134	3731	3403	2172	1620	
	Average of Chinook	183	418	277											
	Average of Coho	1084	2958	1833											
	Average of Sockeye	132	269	187											
	Average of Pink	107	155	126											
	Average of Chum	6	15	10											
Total Average of Trips		30295	33258	31480											
Total Average of Chinook		4654	5289	4908											
Total Average of Coho		9434	15418	11828											
Total Average of Sockeye		467	641	537											
Total Average of Pink		5423	5693	5531											
Total Average of Chum		652	1419	959											
*KPWS = Kake, Petersburg, Wrangell, Stikine															

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by NRC using ADF&G observed data for each base period (1988-1993 and 1994-1997). This information was used to quantify the following parameters:

- Salmon angler days made by residents and nonresidents, by community
- Net benefits (net willingness to pay) to ocean salmon anglers
- Gross and net income (profits) to sport fishing-related businesses from salmon fishing
- Direct personal income at the local (community) level associated with sport fishing for salmon

Salmon Angler Days

The number of sport fishing trips (Table D-2) were converted to angler days using a multiplier of 1.53, which was derived from ADF&G data for Southeast Alaska for 1996. The total number of angler days was allocated to resident and nonresident anglers based on ADF&G data on the proportion of angler days by residents and nonresidents from 1991 through 1996. Resident anglers were assigned 52.3 percent of the salmon angler days and nonresident anglers were assigned 47.7 percent. The proportion of angler days targeted on salmon, as reported by Jones & Stokes Associates (1991), was used to estimate angler days targeted on salmon. About 58 percent of angler days by residents were assumed to target salmon, whereas 48 percent of angler days by nonresidents were assumed to target salmon.

The number of resident and nonresident salmon angler days was allocated to communities in Southeast Alaska based on each community's relative proportion of population in the harvest area (Table D-3).

Net Benefits to Ocean Salmon Anglers

The net benefits to ocean salmon anglers, as measured by their net willingness to pay for salmon fishing opportunities, were estimated based on average per trip values for sport fishing for salmon by harvest area, as reported by Jones & Stokes Associates (1991). It was assumed that the per trip values reported by Jones & Stokes Associates were equivalent to per-day values (Table D-4).

Table D-3. Worksheet for distributing salmon angler days by area.

1988-93 Base					
	% Distribution of All Sportfishing Trips (res and nonres) from NRC Data (used)	Resident Salmon Days Fished	Non-Resident Salmon Days Fished	1998 Pop	% of Area Pop
Ketchikan (Area A)	0.201	25538	19050	9971	
Ketchikan		21691	16180	8469	0.849
Metlakatla		3267	2870	1502	0.151
Prince of Wales (Area B)	0.079	10018	7473	2145	
Craig		10018	7473	2145	1.000
Kake/Petersburg/Wrangell/ Stikine (Area C)	0.121	15377	11470	6770	
Petersburg		7718	5757	3398	0.502
Kake		1778	1327	783	0.116
Wrangell		5881	4386	2589	0.382
Sitka (Area D)	0.172	21783	16248	9874	
Sitka		19367	14446	8779	0.889
Hoonah		1977	1474	896	0.091
Pelican		329	245	149	0.015
Elfin Cove		110	82	50	0.005
Juneau (Area E)	0.335	42428	31649	30684	
Juneau		42428	31649	30684	1.000
Haines/Skagway (Area F)	0.026	3341	2493	1463	
Haines		3341	2493	1463	1.000
Glacier Bay (Area G)	0.030	3775	2816	468	
Gustavus		2968	2214	368	0.786
Excursion Inlet (est.)		807	602	100	0.214
Yakutat (Area H)	0.036	1377	3403	810	
Yakutat		1377	3403	810	1.000
TOTAL	1	123637	94602		

Table D-3. Worksheet for distributing salmon angler days by area.

1994-97 Base					
	% Distribution of All Sportfishing Trips (res and nonres) from NRC Data (used)	Salmon Days Fished	Salmon Days Fished	1998 Pop	% of Area Pop
Ketchikan (Area A)	0.179	24517	18288	9971	
Ketchikan		20824	15533	8469	0.849
Metlakatla		3137	2755	1502	0.151
Prince of Wales (Area B)	0.105	14365	10715	2145	
Craig		14365	10715	2145	1.000
Kake/Petersburg/Wrangell/ Stikine (Area C)	0.104	14209	10599	6770	
Petersburg		7132	5320	3398	0.502
Kake		1643	1226	783	0.116
Wrangell		5434	4053	2589	0.382
Sitka (Area D)	0.212	28989	21624	9874	
Sitka		25774	19226	8779	0.889
Hoonah		2631	1962	896	0.091
Pelican		437	326	149	0.015
Elfin Cove		147	109	50	0.005
Juneau (Area E)	0.322	43968	32797	30684	
Juneau		43968	32797	30684	1.000
Haines/Skagway (Area F)	0.020	2698	2013	1463	
Haines		2698	2013	1463	1.000
Glacier Bay (Area G)	0.042	5779	4311	468	
Gustavus		4544	3390	368	0.786
Excursion Inlet (est.)		1235	921	100	0.214
Yakutat (Area H)	0.016	2172	1620	810	
Yakutat		2172	1620	810	1.000
TOTAL	1	136697	101967		

Table D-4. Net values (in 1988 dollars) to ocean salmon anglers.

Harvest Area	Resident Anglers	Non-Resident Anglers
Ketchikan	$174	$203
Prince of Wales	$90	$88
Petersburg/Wrangell	$29	$127
Sitka	$174	$129
Juneau	$187	$142
Haines	$116	$93
Glacier Bay	$149	$120
Yakutat	$90	$92

These values were then converted to 1996 dollars using the consumer price index (1.32) for Anchorage, Alaska, and multiplied by the number of predicted angler days (Tables D-6a and D-6b) for resident and nonresident anglers to estimate total angler benefits by alternative.

Gross and Net Income to Sport Fishing-Related Businesses

Gross income to sport fishing-related businesses was approximated based on angler expenditures on sport fishing for salmon, which were estimated based on information from Jones & Stokes Associates (1991). For resident anglers, a weighted per-day spending average was derived based on reported spending profiles for sport fishing for different salmon species at different marine locations throughout Southeast Alaska. For nonresident anglers, the average spending per angler day, as reported by Jones & Stokes Associates (1991), was used. These values, which were adjusted to 1996 dollars using the consumer price index for Anchorage, Alaska, are reported in Table D-5.

The per-day spending profiles described above were used with the predicted number of salmon angler days to estimate total revenues received by sport fishing-related businesses. It should be noted that only trip-related expenditures were estimated because it was assumed that spending on most durable goods such as fishing equipment and boats would not be affected. The net income to affected sport fishing-related businesses was estimated based on a net income coefficient derived from data on proprietary income in the 1992 IMPLAN data base for Clatsop County, Oregon. A weighted average was estimated from five sport fishing-related sectors: food stores, eating and drinking establishments, service stations and fuel, hotels and motels, and miscellaneous retail trade. The relative amount of angler spending in these sectors, based on information reported by the U.S. Fish and Wildlife Service (1999), was used to weight the percentages for each sector. The resulting coefficient (11.6 percent) was applied to sport fishing-related revenues to estimate net income. These calculations are shown in Table D-6a (Baseline 1) and Table D-6b (Baseline 2).

Direct Personal Income from Salmon Sport Fishing

Direct personal income generated by salmon angler spending was estimated based on personal income coefficients applied to sport fishing-related revenues generated by

resident and nonresident anglers. Earning-to-sales ratios for different sport fishing-related business sectors were derived from information by Jones & Stokes Associates (1991). These ratios, which were developed for resident and nonresident angler spending, were weighted averages based on the proportion of spending in each business sector. The ratios were then adjusted upwards to account for profits and rents, which were assumed to account for 15 percent of total sales. The resulting coefficients (0.47 for nonresident spending and 0.38 for resident spending) were applied to total revenues to estimate the direct personal income effect. These calculations are shown in Tables D-6a and D-6b.

Table D-5. Worksheet for estimating average spending per salmon angler day by SEAK anglers.

Resident Spending per Day					
Location/Species	**Ave. Per Day**	**Sample Size**	**Total**	**Ave. Spending/Day (1988$)**	**Ave. Spending/Day (1996$)**
A1-KS	41.76	85	3549.6		
A1-SS	27.88	48	1338.24		
A2-KS	41.63	38	1581.94		
A2-Ps	7.52	31	233.12		
A5-KS	45.65	55	2510.75		
B2-SS	0.47	32	15.04		
C1-KS	35.85	89	3190.65		
C4-KS	26.08	76	1982.08		
C5-KS	42.35	31	1312.85		
C5-SS	10.39	31	322.09		
D1-KS	58.01	161	9339.61		
D4-KS	34.42	91	3132.22		
E1-KS	37.32	330	12315.6		
E1-SS	32.42	226	7326.92		
E2-KS	55.56	153	8500.68		
E2-SS	33.74	77	2597.98		
E3-KS	33.85	71	2403.35		
E3-SS	35.78	58	2075.24		
E6-Ks	23.88	48	1146.24		
E6-PS	8.3	77	639.1		
E6-SS	14.76	50	738		
F1-Ks	29.71	84	2495.64		
F3-RS	34.87	39	1359.93		
		1981	70106.9	$35.39	$46.71
Non-Resident Spending Per Angler Day				$172.48	$227.67

Table D-6a. Worksheet for estimating direct personal income from SEAK Salmon Sport Fishery (1988-93 base).

Port/Alternative	SALMON DAYS	EXP/DAY	REVENUES	NET INCOME FOR BUSINESSES	DIRECT PERSONAL INCOME	REGIONAL INC COEF	REGIONAL INCOME
Ketchikan							
Alternative 1	37871		$4,696,887		$2,116,350		$3,322,670
Residents	21691	46.71	$1,013,187	$117,530	$385,011	1.57	$604,467
Non-Residents	16180	227.67	$3,683,701	$427,309	$1,731,339	1.57	$2,718,203
Alternative 2	37871		$4,696,887		$2,116,350		$3,322,670
Residents	21691	46.71	$1,013,187	$117,530	$385,011	1.57	$604,467
Non-Residents	16180	227.67	$3,683,701	$427,309	$1,731,339	1.57	$2,718,203
Alternative 3	0		$0				0
Metlakatla							
Alternative 1	6137		$806,014		$365,093		$573,195
Residents	3267	46.71	$152,602	$17,702	$57,989	1.57	$91,042
Non-Residents	2870	227.67	$653,413	$75,796	$307,104	1.57	$482,153
Alternative 2	6137		$806,014		$365,093		$573,195
Residents	3267	46.71	$152,602		$57,989	1.57	$91,042
Non-Residents	2870	227.67	$653,413		$307,104	1.57	$482,153
Alternative 3	0		$0				0
Craig							
Alternative 1	17491		$2,169,319		$977,465		$1,534,620
Residents	10018	46.71	$467,941	$54,281	$177,817	1.57	$279,173
Non-Residents	7473	227.67	$1,701,378	$197,360	$799,648	1.57	$1,255,447
Alternative 2	17491		$2,169,319		$977,465		$1,534,620
Residents	10018	46.71	$467,941		$177,817	1.57	$279,173
Non-Residents	7473	227.67	$1,701,378		$799,648	1.57	$1,255,447
Alternative 3	0		$0				0
Petersburg							
Alternative 1	13515		$1,680,311		$757,300		$1,188,962
Residents	7718	46.71	$360,508	$41,819	$136,993	1.57	$215,079

Table D-6a. Worksheet for estimating direct personal income from SEAK Salmon Sport Fishery (1988-93 base).							
Non-Residents	5797	227.67	$1,319,803	$153,097	$620,307	1.57	$973,883
Alternative 2	13515		$1,680,311		$757,300		$1,188,962
Residents	7718	46.71	$360,508		$136,993	1.57	$215,079
Non-Residents	5797	227.67	$1,319,803		$620,307	1.57	$973,883
Alternative 3	0		$0		$173,555		0
Kake					$0		
Alternative 1	3105		$385,168		$173,555		$272,481
Residents	1778	46.71	$83,050	$9,634	$31,559	1.57	$49,548
Non-Residents	1327	227.67	$302,118	$35,046	$141,996	1.57	$222,933
Alternative 2	3105		$385,168		$173,555		$272,481
Residents	1778	46.71	$83,050		$31,559	1.57	$49,548
Non-Residents	1327	227.67	$302,118		$141,996	1.57	$222,933
Alternative 3	0		$0				0
Wrangell							
Alternative 1	10267		$1,273,262		$573,710		$900,725
Residents	5881	46.71	$274,702	$31,865	$104,387	1.57	$163,887
Non-Residents	4386	227.67	$998,561	$115,833	$469,323	1.57	$736,838
Alternative 2	10267		$1,273,262		$573,710		$900,725
Residents	5881	46.71	$274,702		$104,387	1.57	$163,887
Non-Residents	4386	227.67	$998,561		$469,323	1.57	$736,838
Alternative 3	0		$0				0
Sitka							
Alternative 1	33813		$4,193,553		$1,889,553		$2,966,598
Residents	19367	46.71	$904,633	$104,937	$343,760	1.57	$539,704
Non-Residents	14446	227.67	$3,288,921	$381,515	$1,545,793	1.57	$2,426,895
Alternative 2	33813		$4,193,553		$1,889,553		$2,966,598
Residents	19367	46.71	$904,633		$343,760	1.57	$539,704
Non-Residents	14446	227.67	$3,288,921		$1,545,793	1.57	$2,426,895
Alternative 3	0		$0				0
Hoonah							
Alternative 1	3451		$427,931		$192,817		$302,722

Table D-6a. Worksheet for estimating direct personal income from SEAK Salmon Sport Fishery (1988-93 base).							
Residents	1977	46.71	$92,346	$10,712	$35,091	1.57	$55,093
Non-Residents	1474	227.67	$335,586	$38,928	$157,725	1.57	$247,629
Alternative 2	3451		$427,931		$192,817		$302,722
Residents	1977	46.71	$92,346		$35,091	1.57	$55,093
Non-Residents	1474	227.67	$335,586		$157,725	1.57	$247,629
Alternative 3	0		$0				0
Pelican							
Alternative 1	574		$71,147		$32,056		$50,328
Residents	329	46.71	$15,368	$1,783	$5,840	1.57	$9,168
Non-Residents	245	227.67	$55,779	$6,470	$26,216	1.57	$41,159
Alternative 2	574		$71,147		$32,056		$50,328
Residents	329	46.71	$15,368		$5,840	1.57	$9,168
Non-Residents	245	227.67	$55,779		$26,216	1.57	$41,159
Alternative 3	0		$0				0
Elfin Cove							
Alternative 1	192		$23,807		$10,727		$16,841
Residents	110	46.71	$5,138	$596	$1,952	1.57	$3,065
Non-Residents	82	227.67	$18,669	$2,166	$8,774	1.57	$13,776
Alternative 2	192		$23,807		$10,727		$16,841
Residents	110	46.71	$5,138		$1,952	1.57	$3,065
Non-Residents	82	227.67	$18,669		$8,774	1.57	$13,776
Alternative 3	0		$0				0
Juneau (Area E)							
Alternative 1	74077		$9,187,340		$4,139,687		$6,499,308
Residents	42428	46.71	$1,981,812	$229,890	$753,089	1.57	$1,182,349
Non-Residents	31649	227.67	$7,205,528	$835,841	$3,386,598	1.57	$5,316,959
Alternative 2	74077		$9,187,340		$4,139,687		$6,499,308
Residents	42428	46.71	$1,981,812		$753,089	1.57	$1,182,349
Non-Residents	31649	227.67	$7,205,528		$3,386,598	1.57	$5,316,959
Alternative 3	0		$0				0
Haines (Area F)							

Table D-6a. Worksheet for estimating direct personal income from SEAK Salmon Sport Fishery (1988-93 base).							
Alternative 1	5834		$723,639		$326,065		$511,923
Residents	3341	46.71	$156,058	$18,103	$59,302	1.57	$93,104
Non-Residents	2493	227.67	$567,581	$65,839	$266,763	1.57	$418,818
Alternative 2	5834		$723,639		$326,065		$511,923
Residents	3341	46.71	$156,058	$18,103	$59,302	1.57	$93,104
Non-Residents	2493	227.67	$567,581	$65,839	$266,763	1.57	$418,818
Alternative 3	0		$0				0
Excursion Inlet							
Alternative 1	1409		$174,752		$78,741		$123,623
Residents	807	46.71	$37,695	$4,373	$14,324	1.57	$22,489
Non-Residents	602	227.67	$137,057	$15,899	$64,417	1.57	$101,135
Alternative 2	1409		$174,752		$78,741		$123,623
Residents	807	46.71	$37,695		$14,324	1.57	$22,489
Non-Residents	602	227.67	$137,057		$64,417	1.57	$101,135
Alternative 3	0		$0				0
Gustavus							
Alternative 1	5182		$642,697		$289,590		$454,657
Residents	2968	46.71	$138,635	$16,082	$52,681	1.57	$82,710
Non-Residents	2214	227.67	$504,061	$58,471	$236,909	1.57	$371,947
Alternative 2	5182		$642,697		$289,590		$454,657
Residents	2968	46.71	$138,635		$52,681	1.57	$82,710
Non-Residents	2214	227.67	$504,061		$236,909	1.57	$371,947
Alternative 3							
Yakutat (Area H)							
Alternative 1	4780		$839,081		$388,579		$610,069
Residents	1377	46.71	$64,320	$7,461	$24,441	1.57	$38,373
Non-Residents	3403	227.67	$774,761	$89,872	$364,138	1.57	$571,696
Alternative 2	4780		$839,081		$388,579		$610,069
Residents	1377	46.71	$64,320		$24,441	1.57	$38,373
Non-Residents	3403	227.67	$774,761		$364,138	1.57	$571,696
Alternative 3	0						
Alternative 1/Alternative 2							

Table D-6a. Worksheet for estimating direct personal income from SEAK Salmon Sport Fishery (1988-93 base).					
Total Angler Days and Spending	217,698	$27,294,909	$12,311,288		$19,328,722
Total Res Angler Days and Spending	123,057	$5,747,992	$2,184,237	1.57	$3,429,252
Total Non Res Angler Days and Spending	94,641	$21,546,916	$10,127,051	1.57	$15,899,470
Notes					
All monetary values are reported in constant 1996 dollars.					
Regional income effects are not reported in the Public Draft EIS.					

Table D-6a. Worksheet for estimating direct personal income from SEAK Salmon Sport Fishery (1988-93 base).

Port/Alternative	SALMON DAYS(a)	EXP/DAY (b)	REVENUES	NET INCOME FOR BUSINESSES	DIRECT PERSONAL INCOME (c)	REGIONAL INC COEF(d)	REGIONAL INCOME
Ketchikan							
Alternative 1	36357		$4,509,087		$2,031,729		$3,189,814
Residents	20824	46.71	$972,689	$112,832	$369,622	1.57	$580,306
Non-Residents	15533	227.67	$3,536,398	$410,222	$1,662,107	1.57	$2,609,508
Alternative 2	36357		$4,509,087		$2,031,729		$3,189,814
Residents	20824	46.71	$972,689	$112,832	$369,622	1.57	$580,306
Non-Residents	15533	227.67	$3,536,398	$410,222	$1,662,107	1.57	$2,609,508
Alternative 3	0		$0				0
Metlakatla							
Alternative 1	5892		$773,760		$350,480		$550,253
Residents	3137	46.71	$146,529	$16,997	$55,681	1.57	$87,419
Non-Residents	2755	227.67	$627,231	$72,759	$294,798	1.57	$462,834
Alternative 2	5892		$773,760		$350,480		$550,253
Residents	3137	46.71	$146,529		$55,681	1.57	$87,419
Non-Residents	2755	227.67	$627,231		$294,798	1.57	$462,834
Alternative 3	0		$0				0
Craig							
Alternative 1	25080		$3,110,473		$1,401,533		$2,200,407
Residents	14365	46.71	$670,989	$77,835	$254,976	1.57	$400,312
Non-Residents	10715	227.67	$2,439,484	$282,980	$1,146,558	1.57	$1,800,095
Alternative 2	25080		$3,110,473		$1,401,533		$2,200,407
Residents	14365	46.71	$670,989		$254,976	1.57	$400,312
Non-Residents	10715	227.67	$2,439,484		$1,146,558	1.57	$1,800,095
Alternative 3	0		$0				0
Petersburg							
Alternative 1	12452		$1,544,340		$695,858		$1,092,496
Residents	7132	46.71	$333,136	$38,644	$126,592	1.57	$198,749

Table D-6a. Worksheet for estimating direct personal income from SEAK Salmon Sport Fishery (1988-93 base).

Non-Residents	5320	227.67	$1,211,204	$140,500	$569,266	1.57	$893,748
Alternative 2	12452		$1,544,340		$695,858		$1,092,496
Residents	7132	46.71	$333,136		$126,592	1.57	$198,749
Non-Residents	5320	227.67	$1,211,204		$569,266	1.57	$893,748
Alternative 3	0		$0		$160,351		0
Kake					$0		
Alternative 1	2869		$355,868		$160,351		$251,751
Residents	1643	46.71	$76,745	$8,902	$29,163	1.57	$45,786
Non-Residents	1226	227.67	$279,123	$32,378	$131,188	1.57	$205,965
Alternative 2	2869		$355,868		$160,351		$251,751
Residents	1643	46.71	$76,745		$29,163	1.57	$45,786
Non-Residents	1226	227.67	$279,123		$131,188	1.57	$205,965
Alternative 3	0		$0				0
Wrangell							
Alternative 1	9487		$1,176,569		$530,143		$832,325
Residents	5434	46.71	$253,822	$29,443	$96,452	1.57	$151,430
Non-Residents	4053	227.67	$922,747	$107,039	$433,691	1.57	$680,895
Alternative 2	9487		$1,176,569		$530,143		$832,325
Residents	5434	46.71	$253,822		$96,452	1.57	$151,430
Non-Residents	4053	227.67	$922,747		$433,691	1.57	$680,895
Alternative 3	0		$0				0
Sitka							
Alternative 1	45000		$5,581,087	$647,406	$2,514,760		$3,948,172
Residents	25774	46.71	$1,203,904	$139,653	$457,483	1.57	$718,249
Non-Residents	19226	227.67	$4,377,183		$2,057,276	1.57	$3,229,924
Alternative 2	45000		$5,581,087		$2,514,760		$3,948,172
Residents	25774	46.71	$1,203,904		$457,483	1.57	$718,249
Non-Residents	19226	227.67	$4,377,183		$2,057,276	1.57	$3,229,924
Alternative 3	0		$0				0
Hoonah							

Table D-6a. Worksheet for estimating direct personal income from SEAK Salmon Sport Fishery (1988-93 base).							
Alternative 1	4593		$569,583		$256,643		$402,930
Residents	2631	46.71	$122,894	$14,256	$46,700	1.57	$73,319
Non-Residents	1962	227.67	$446,689	$51,816	$209,944	1.57	$329,611
Alternative 2	4593		$569,583		$256,643		$402,930
Residents	2631	46.71	$122,894		$46,700	1.57	$73,319
Non-Residents	1962	227.67	$446,689		$209,944	1.57	$329,611
Alternative 3	0		$0				0
Pelican							
Alternative 1	763		$94,633		$42,640		$66,945
Residents	437	46.71	$20,412	$2,368	$7,757	1.57	$12,178
Non-Residents	326	227.67	$74,220	$8,610	$34,884	1.57	$54,767
Alternative 2	763		$94,633		$42,640		$66,945
Residents	437	46.71	$20,412		$7,757	1.57	$12,178
Non-Residents	326	227.67	$74,220		$34,884	1.57	$54,767
Alternative 3	0		$0				0
Elfin Cove							
Alternative 1	256		$31,682		$14,273		$22,408
Residents	147	46.71	$6,866	$796	$2,609	1.57	$4,096
Non-Residents	109	227.67	$24,816	$2,879	$11,664	1.57	$18,312
Alternative 2	256		$31,682		$14,273		$22,408
Residents	147	46.71	$6,866		$2,609	1.57	$4,096
Non-Residents	109	227.67	$24,816		$11,664	1.57	$18,312
Alternative 3	0		$0				0
Juneau (Area E)							
Alternative 1	76765		$9,520,638		$4,289,863		$6,735,085
Residents	43968	46.71	$2,053,745	$238,234	$780,423	1.57	$1,225,264
Non-Residents	32797	227.67	$7,466,893	$866,160	$3,509,440	1.57	$5,509,820
Alternative 2	76765		$9,520,638		$4,289,863		$6,735,085
Residents	43968	46.71	$2,053,745		$780,423	1.57	$1,225,264
Non-Residents	32797	227.67	$7,466,893		$3,509,440	1.57	$5,509,820
Alternative 3	0		$0				0

Table D-6a. Worksheet for estimating direct personal income from SEAK Salmon Sport Fishery (1988-93 base).

Haines (Area F)							
Alternative 1	4711		$584,323		$263,290		$413,365
Residents	2698	46.71	$126,024	$14,619	$47,889	1.57	$75,186
Non-Residents	2013	227.67	$458,300	$53,163	$215,401	1.57	$338,179
Alternative 2	4711		$584,323		$263,290		$413,365
Residents	2698	46.71	$126,024		$47,889	1.57	$75,186
Non-Residents	2013	227.67	$458,300		$215,401	1.57	$338,179
Alternative 3	0		$0				0
Excursion Inlet							
Alternative 1	2156		$267,371		$120,473		$189,142
Residents	1235	46.71	$57,687	$6,692	$21,921	1.57	$34,416
Non-Residents	921	227.67	$209,684	$24,323	$98,552	1.57	$154,726
Alternative 2	2156		$267,371		$120,473		$189,142
Residents	1235	46.71	$57,687		$21,921	1.57	$34,416
Non-Residents	921	227.67	$209,684		$98,552	1.57	$154,726
Alternative 3	0		$0				0
Gustavus							
Alternative 1	7934		$984,052		$443,402		$696,141
Residents	4544	46.71	$212,250	$24,621	$80,655	1.57	$126,628
Non-Residents	3390	227.67	$771,801	$89,529	$362,747	1.57	$569,512
Alternative 2	7934		$984,052		$443,402		$696,141
Residents	4544	46.71	$212,250		$80,655	1.57	$126,628
Non-Residents	3390	227.67	$771,801		$362,747	1.57	$569,512
Alternative 3							
Yakutat (Area H)							
Alternative 1	3792		$470,280		$211,901		$332,684
Residents	2172	46.71	$101,454	$11,769	$38,553	1.57	$60,528
Non-Residents	1620	227.67	$368,825	$42,784	$173,348	1.57	$272,156
Alternative 2	3792		$470,280		$211,901		$332,684
Residents	2172	46.71	$101,454		$38,553	1.57	$60,528
Non-Residents	1620	227.67	$368,825		$173,348	1.57	$272,156

Table D-6a. Worksheet for estimating direct personal income from SEAK Salmon Sport Fishery (1988-93 base).					
Alternative 3	0				
Alternative 1/Alternative 2					
Total Angler Days and Spending	238,107	$29,573,745	$13,327,337		$20,923,919
Total Res Angler Days and Spending	136,141	$6,359,146	$2,416,476	1.57	$3,793,867
Total Non Res Angler Days and Spending	101,966	$23,214,599	$10,910,862	1.57	$17,130,053
Notes					
All monetary values are reported in constant 1996 dollars.					
Regional income effects are not reported in the Public Draft EIS.					

It should be noted that the analytical procedures used to estimate direct personal income effects do not differentiate between spending by resident and nonresident anglers. From a local or regional economic impact perspective, this distinction is important because spending by anglers who live outside the region of interest represents "new" income to the region, whereas spending by residents of the region is primarily income that is re-directed from other activities within the region. This distinction could not be accurately accounted for in the analysis because of limited data on spending patterns of resident anglers. The impact on the analysis of not accounting for this effect is that the estimates of changes in direct personal income are overstated, probably by 20 to 30 percent.

Regional income coefficients also were developed based on the relationship between direct earning and earnings at the regional level, as reported by Jones & Stokes Associates (1991). The results of applying these coefficients also are presented in Tables D-6a and D-6b, but are not presented in the FPEIS, as noted in the tables.

D.4.1.2 Commercial Salmon Fishery

NRC provided estimates of the chinook and coho salmon harvest by alternative for different harvest areas (e.g., Ketchikan, Prince of Wales, etc.) in Southeast Alaska. These estimates were derived using a spreadsheet model that allocates the allowable annual quota of chinook harvest to commercial troll fishers based on observed weekly harvests during the two base periods (1988-1993 and 1994-1997). The length of the season, which is the primary variable that affects harvest, was specified consistent with the objectives of the alternatives (see Chapter 2 of the FPEIS). Harvest estimates of other salmon reflect the average annual harvest observed during the two base periods. The estimates of total salmon harvest were used to quantify the following parameters:

- Ex-vessel value (revenues) to commercial salmon fishers, by port area
- Net income (profits) to commercial salmon fishers, by port area
- Direct personal income (earnings and profits) to commercial salmon harvesters, by port area

Ex-Vessel Value

The harvest of chinook and coho salmon developed by NRC and the average harvest of other salmon species in the troll fishery for Baselines 1 and 2 were allocated to the port areas in Southeast Alaska based on information on fish ticket receipts for the 1995 through 1988 period. These percentages are shown in the "% Distribution" column in Table D-7. The percentages shown in Table D-7 reflect an upward adjustment that was made to account for the 20 percent of harvest that was identified as "unknown." The unknown landings result from fish sold to the public and restaurants, and for fish sold by exporters. This 20 percent was allocated proportionately to the port areas with reported landings.

The ex-vessel value of the landings by port was estimated based on the average value per fish in 1997, as developed by NRC. These values, which were converted to 1996 dollars using a consumer price index deflator for Anchorage, Alaska, are shown in Tables D-8a (1988-93 base) and D-8b (1994-97 base).

Net Income to Commercial Salmon Permit Holders

The net income (profits) to permit holders trolling for salmon was estimated based on a net income coefficient derived from a 1996 study on the economic effects of changes in the sockeye fishery in Cook Inlet, which was prepared by the Institute of Social and Economic Research (ISER) at the University of Alaska, Anchorage. The ISER study estimated landings models using logit statistical techniques applied to time series data from 1990 through 1993. Information from ISER (1996) indicates that, of the $1.43 per pound received by driftnet fishers for the sockeye harvest, $0.61 is net income. This per pound estimate of net income is associated with a commercial harvest reduction of 230,000 fish. These ex-vessel and net income values were used to calculate a net income coefficient (0.426) that was used to estimate net income effects that are presented in Tables D-8a and D-8b.

Direct Personal Income to Commercial Fishers Trolling for Salmon

The personal income (earnings and profits) to commercial fishers (permit holders and crew) trolling for salmon was estimated based on a direct income coefficient derived from a 1999 study on the economic impacts of commercial fisheries in Southeast Alaska that was prepared by Jeff Hartman of the Alaska Department of Fish & Game. Information from that study indicates that, of the $223 million in ex-vessel value for landings in the commercial fishery (all species) in Southeast Alaska in 1994, about $106 million was direct income to harvesters (permit holders and crew). These values were used to calculate a direct personal income coefficient (0.477) that was used to estimate the direct personal income effects presented in Tables D-8a and D-8b.

Table D-7. Worksheet for allocating commercial salmon harvest by port area.

Alternative 1						
88-93 Base Period						
	% Distribution	Chinook	Coho	Chum	Pink	Sockeye
Sitka	0.4723	132,508	762,292	67,436	398,011	7,584
Excursion Inlet	0.0985	27,635	158,979	14,064	83,007	1,582
Hoonah	0.0783	21,968	126,376	11,180	65,984	1,257
Ketchikan	0.0745	20,902	120,243	10,637	62,782	1,196
Petersburg	0.0707	19,836	114,110	10,095	59,579	1,135
Pelican	0.0505	14,168	81,507	7,210	42,557	811
Yakutat	0.0492	13,804	79,409	7,025	41,461	790
Craig	0.0391	10,970	63,107	5,583	32,950	628
Kake	0.0202	5,667	32,603	2,884	17,023	324
Juneau	0.0164	4,601	26,470	2,342	13,820	263
Elfin Cove	0.0164	4,601	26,470	2,342	13,820	263
Wrangell	0.0088	2,469	14,203	1,256	7,416	141
Gustavus	0.0025	701	4,035	357	2,107	40
Haines	0.0013	365	2,098	186	1,096	21
Metlakatla	0.0013	365	2,098	186	1,096	21
TOTAL	1	280,560	1,614,000	142,782	842,707	16,057
		280,560	1,614,000	142,782	842,707	16,057
Alternative 1						
94-97 Base Period						
	% Distribution	Chinook	Coho	Chum	Pink	Sockeye
Sitka	0.4723	70,450	971,521	156,366	355,812	11,708
Excursion Inlet	0.0985	14,693	202,615	32,611	74,206	2,442
Hoonah	0.0783	11,680	161,063	25,923	58,988	1,941
Ketchikan	0.0745	11,113	153,247	24,665	56,125	1,847
Petersburg	0.0707	10,546	145,430	23,407	53,263	1,753
Pelican	0.0505	7,533	103,879	16,719	38,045	1,252
Yakutat	0.0492	7,339	101,204	16,289	37,065	1,220
Craig	0.0391	5,832	80,429	12,945	29,456	969
Kake	0.0202	3,013	41,551	6,688	15,218	501
Juneau	0.0164	2,446	33,735	5,430	12,355	407
Elfin Cove	0.0164	2,446	33,735	5,430	12,355	407
Wrangell	0.0088	1,313	18,102	2,913	6,630	218
Gustavus	0.0025	373	5,143	828	1,883	62
Haines	0.0013	194	2,674	430	979	32
Metlakatla	0.0013	194	2,674	430	979	32
TOTAL	1	149,164	2,057,000	331,073	753,360	24,789

Table D-7. Worksheet for allocating commercial salmon harvest by port area.

		149,164	2,057,000	331,073	753,360	24,789
Alternative 2						
88-93 Base Period						
	% Distribution	Chinook	Coho	Chum	Pink	Sockeye
Sitka	0.4723	129,387	762,292	67,436	398,011	7,584
Excursion Inlet	0.0985	26,984	158,979	14,064	83,007	1,582
Hoonah	0.0783	21,450	126,376	11,180	65,984	1,257
Ketchikan	0.0745	20,409	120,243	10,637	62,782	1,196
Petersburg	0.0707	19,368	114,110	10,095	59,579	1,135
Pelican	0.0505	13,834	81,507	7,210	42,557	811
Yakutat	0.0492	13,478	79,409	7,025	41,461	790
Craig	0.0391	10,711	63,107	5,583	32,950	628
Kake	0.0202	5,534	32,603	2,884	17,023	324
Juneau	0.0164	4,493	26,470	2,342	13,820	263
Elfin Cove	0.0164	4,493	26,470	2,342	13,820	263
Wrangell	0.0088	2,411	14,203	1,256	7,416	141
Gustavus	0.0025	685	4,035	357	2,107	40
Haines	0.0013	356	2,098	186	1,096	21
Metlakatla	0.0013	356	2,098	186	1,096	21
TOTAL	1	273,950	1,614,000	142,782	842,707	16,057
		273,950	1,614,000	142,782	842,707	16,057
Alternative 2						
94-97 Base Period						
	% Distribution	Chinook	Coho	Chum	Pink	Sockeye
Sitka	0.4723	66,974	971,521	156,366	355,812	11,708
Excursion Inlet	0.0985	13,968	202,615	32,611	74,206	2,442
Hoonah	0.0783	11,103	161,063	25,923	58,988	1,941
Ketchikan	0.0745	10,564	153,247	24,665	56,125	1,847
Petersburg	0.0707	10,025	145,430	23,407	53,263	1,753
Pelican	0.0505	7,161	103,879	16,719	38,045	1,252
Yakutat	0.0492	6,977	101,204	16,289	37,065	1,220
Craig	0.0391	5,544	80,429	12,945	29,456	969
Kake	0.0202	2,864	41,551	6,688	15,218	501
Juneau	0.0164	2,326	33,735	5,430	12,355	407
Elfin Cove	0.0164	2,326	33,735	5,430	12,355	407
Wrangell	0.0088	1,248	18,102	2,913	6,630	218
Gustavus	0.0025	355	5,143	828	1,883	62
Haines	0.0013	184	2,674	430	979	32
Metlakatla	0.0013	184	2,674	430	979	32
TOTAL	1	141,803	2,057,000	331,073	753,360	24,789
		141,803	2,057,000	331,073	753,360	24,789

Table D-8a. Worksheet for estimating direct personal income from SEAK commercial salmon fishery (1988-93 base).

Port/Alternative	HARVEST (number of fish)	VALUE PER FISH	HARVEST (EX-VESSEL) VALUE	DIRECT HARVESTOR INCOME	REGIONAL INCOME
Ketchikan					
Alternative 1			$1,794,172	$855,834.74	$1,797,681
Chinook	20902	30.97	$647,335		
Coho	120243	8.88	$1,067,758		
Chum	10637	1.93	$20,529		
Pink	62782	0.8	$50,226		
Sockeye	1196	6.96	$8,324		
Alternative 2, Option 1			$1,778,904	$848,551.68	$1,782,383
Chinook	20409	30.97	$632,067		
Coho	120243	8.88	$1,067,758		
Chum	10637	1.93	$20,529		
Pink	62782	0.8	$50,226		
Sockeye	1196	6.96	$8,324		
Alternative 3	0				
Metlakatla					
Alternative 1			$31,316	$14,938.10	$31,377
Chinook	365	30.97	$11,304		
Coho	2098	8.88	$18,630		
Chum	186	1.93	$359		
Pink	1096	0.8	$877		
Sockeye	21	6.96	$146		
Alternative 2, Option 1			$31,038	$14,805.14	$31,098
Chinook	356	30.97	$11,025		
Coho	2098	8.88	$18,630		
Chum	186	1.93	$359		
Pink	1096	0.8	$877		
Sockeye	21	6.96	$146		
Alternative 3	0				
Craig					
Alternative 1			$941,637	$449,168.64	$943,479
Chinook	10970	30.97	$339,741		
Coho	63107	8.88	$560,390		
Chum	5583	1.93	$10,775		
Pink	32950	0.8	$26,360		
Sockeye	628	6.96	$4,371		

Table D-8a. Worksheet for estimating direct personal income from SEAK commercial salmon fishery (1988-93 base).					
Alternative 2, Option 1			$933,616	$445,342.44	$935,442
Chinook	10711	30.97	$331,720		
Coho	63107	8.88	$560,390		
Chum	5583	1.93	$10,775		
Pink	32950	0.8	$26,360		
Sockeye	628	6.96	$4,371		
Alternative 3	0				
Petersburg					
Alternative 1			$1,700,409	$811,108.96	$1,703,734
Chinook	19836	30.97	$614,321		
Coho	114110	8.88	$1,013,297		
Chum	10095	1.93	$19,483		
Pink	59579	0.8	$47,663		
Sockeye	811	6.96	$5,645		
Intermed.Alt. 1			$1,688,170	$805,270.90	$1,691,472
Chinook	19368	30.97	$599,827		
Coho	114110	8.88	$1,013,297		
Chum	10095	1.93	$19,483		
Pink	59579	0.8	$47,663		
Sockeye	1135	6.96	$7,900		
Alternative 3	0				
Kake					
Alternative 1			$486,461	$232,045.98	$487,413
Chinook	5667	30.97	$175,507		
Coho	32603	8.88	$289,515		
Chum	2884	1.93	$5,566		
Pink	17023	0.8	$13,618		
Sockeye	324	6.96	$2,255		
Alternative 2, Option 1			$482,342	$230,081.18	$483,286
Chinook	5534	30.97	$171,388		
Coho	32603	8.88	$289,515		
Chum	2884	1.93	$5,566		
Pink	17023	0.8	$13,618		
Sockeye	324	6.96	$2,255		
Alternative 3	0				
Wrangell					
Alternative 1			$211,926	$101,090.35	$212,340
Chinook	2469	30.97	$76,465		
Coho	14203	8.88	$126,123		
Chum	1256	1.93	$2,424		

Table D-8a. Worksheet for estimating direct personal income from SEAK commercial salmon fishery (1988-93 base).					
Pink	7416	0.8	$5,933		
Sockeye	141	6.96	$981		
Alternative 2, Option 1			$210,130	$100,233.52	$210,541
Chinook	2411	30.97	$74,669		
Coho	14203	8.88	$126,123		
Chum	1256	1.93	$2,424		
Pink	7416	0.8	$5,933		
Sockeye	141	6.96	$981		
Alternative 3	0				
Sitka					
Alternative 1			$11,374,271	$5,425,620.42	$11,396,516
Chinook	132508	30.97	$4,103,773		
Coho	762292	8.88	$6,769,153		
Chum	67436	1.93	$130,151		
Pink	398011	0.8	$318,409		
Sockeye	7584	6.96	$52,785		
Alternative 2, Option 1			$11,277,613	$5,379,514.06	$11,299,669
Chinook	129387	30.97	$4,007,115		
Coho	762292	8.88	$6,769,153		
Chum	67436	1.93	$130,151		
Pink	398011	0.8	$318,409		
Sockeye	7584	6.96	$52,785		
Alternative 3	0				
Hoonah					
Alternative 1			$1,885,681	$899,485.38	$1,889,369
Chinook	21968	30.97	$680,349		
Coho	126376	8.88	$1,122,219		
Chum	11180	1.93	$21,577		
Pink	65984	0.8	$52,787		
Sockeye	1257	6.96	$8,749		
Alternative 2, Option 1			$1,869,639	$891,833.00	$1,873,295
Chinook	21450	30.97	$664,307		
Coho	126376	8.88	$1,122,219		
Chum	11180	1.93	$21,577		
Pink	65984	0.8	$52,787		
Sockeye	1257	6.96	$8,749		
Alternative 3					
Pelican					
Alternative 1			$1,216,024	$580,053.63	$1,218,403
Chinook	14168	30.97	$438,783		

Table D-8a. Worksheet for estimating direct personal income from SEAK commercial salmon fishery (1988-93 base).					
Coho	81507	8.88	$723,782		
Chum	7210	1.93	$13,915		
Pink	42557	0.8	$34,046		
Sockeye	790	6.96	$5,498		
Alternative 2, Option 1			$1,205,680	$575,119.46	$1,208,038
Chinook	13834	30.97	$428,439		
Coho	81507	8.88	$723,782		
Chum	7210	1.93	$13,915		
Pink	42557	0.8	$34,046		
Sockeye	790	6.96	$5,498		
Alternative 3	0				
Elfin Cove					
Alternative 1			$394,953	$188,395.87	$395,726
Chinook	4601	30.97	$142,493		
Coho	26470	8.88	$235,054		
Chum	2342	1.93	$4,520		
Pink	13820	0.8	$11,056		
Sockeye	263	6.96	$1,830		
Alternative 2, Option 1			$391,608	$186,800.40	$392,374
Chinook	4493	30.97	$139,148		
Coho	26470	8.88	$235,054		
Chum	2342	1.93	$4,520		
Pink	13820	0.8	$11,056		
Sockeye	263	6.96	$1,830		
Alternative 3	0				
Juneau					
Alternative 1			$394,953	$188,395.87	$395,726
Chinook	4601	30.97	$142,493		
Coho	26470	8.88	$235,054		
Chum	2342	1.93	$4,520		
Pink	13820	0.8	$11,056		
Sockeye	263	6.96	$1,830		
Alternative 2, Option 1			$391,608	$186,800.40	$392,374
Chinook	4493	30.97	$139,148		$0
Coho	26470	8.88	$235,054		
Chum	2342	1.93	$4,520		
Pink	13820	0.8	$11,056		
Sockeye	263	6.96	$1,830		
Alternative 3					
Haines					

Table D-8a. Worksheet for estimating direct personal income from SEAK commercial salmon fishery (1988-93 base).					
Alternative 1			$31,316	$14,938.10	$31,377
Chinook	365	30.97	$11,304		
Coho	2098	8.88	$18,630		
Chum	186	1.93	$359		
Pink	1096	0.8	$877		
Sockeye	21	6.96	$146		
Alternative 2, Option 1			$31,038	$14,805.14	$31,098
Chinook	356	30.97	$11,025		
Coho	2098	8.88	$18,630		
Chum	186	1.93	$359		
Pink	1096	0.8	$877		
Sockeye	21	6.96	$146		
Alternative 3					
Excursion Inlet					
Alternative 1			$2,372,149	$1,131,534.68	$2,376,789
Chinook	27635	30.97	$855,856		
Coho	158979	8.88	$1,411,734		
Chum	14064	1.93	$27,144		
Pink	83007	0.8	$66,406		
Sockeye	1582	6.96	$11,011		
Alternative 2, Option 1			$2,351,988	$1,121,917.50	$2,356,588
Chinook	26984	30.97	$835,694		
Coho	158979	8.88	$1,411,734		
Chum	14064	1.93	$27,144		
Pink	83007	0.8	$66,406		
Sockeye	1582	6.96	$11,011		
Alternative 3	0				
Gustavus					
Alternative 1			$60,194	$28,712.93	$60,312
Chinook	701	30.97	$21,710		
Coho	4035	8.88	$35,831		
Chum	357	1.93	$689		
Pink	2107	0.8	$1,686		
Sockeye	40	6.96	$278		
Alternative 2			$59,698	$28,476.56	$59,815
Chinook	685	30.97	$21,214		
Coho	4035	8.88	$35,831		
Chum	357	1.93	$689		
Pink	2107	0.8	$1,686		
Sockeye	40	6.96	$278		
Alternative 3	0				

Table D-8a. Worksheet for estimating direct personal income from SEAK commercial salmon fishery (1988-93 base).					
Yakutat					
Alternative 1			$1,184,887	$565,200.94	$1,187,205
Chinook	13804	30.97	$427,510		
Coho	79409	8.88	$705,152		
Chum	7025	1.93	$13,558		
Pink	41461	0.8	$33,169		
Sockeye	790	6.96	$5,498		
Alternative 2			$1,174,791	$560,384.96	$1,177,089
Chinook	13478	30.97	$417,414		
Coho	79409	8.88	$705,152		
Chum	7025	1.93	$13,558		
Pink	41461	0.8	$33,169		
Sockeye	790	6.96	$5,498		
Alternative 3	0				
Alternative 1			$24,080,350	$11,486,525	$24,127,445
Alternative 2			$23,877,863	$11,389,936	$23,924,561
Notes					
All monetary values are reported in constant 1996 dollars.					
Regional income effects are not reported in the Public Draft EIS.					

Table D-8b. Worksheet for estimating direct personal income from SEAK salmon commercial fishery (1994-97 base).

Port/Alternative	HARVEST (number of fish)	VALUE PER FISH	HARVEST (EX-VESSEL) VALUE	DIRECT HARVESTOR INCOME	REGIONAL INCOME
Ketchikan					
Alternative 1			$1,810,362	$863,557.31	$1,813,902
Chinook	11113	30.97	$344,170		
Coho	153247	8.88	$1,360,833		
Chum	24665	1.93	$47,603		
Pink	56125	0.8	$44,900		
Sockeye	1847	6.96	$12,855		
Alternative 2, Option 1			$1,793,359	$855,446.96	$1,796,866
Chinook	10564	30.97	$327,167		
Coho	153247	8.88	$1,360,833		
Chum	24665	1.93	$47,603		
Pink	56125	0.8	$44,900		
Sockeye	1847	6.96	$12,855		
Alternative 3	0				
Metlakatla					
Alternative 1			$31,589	$15,068.27	$31,651
Chinook	194	30.97	$6,008		
Coho	2674	8.88	$23,745		
Chum	430	1.93	$830		
Pink	979	0.8	$783		
Sockeye	32	6.96	$223		
Alternative 2, Option 1			$31,279	$14,920.54	$31,341
Chinook	184	30.97	$5,698		
Coho	2674	8.88	$23,745		
Chum	430	1.93	$830		
Pink	979	0.8	$783		
Sockeye	32	6.96	$223		
Alternative 3	0				
Craig					
Alternative 1			$950,119	$453,214.77	$951,978
Chinook	5832	30.97	$180,617		
Coho	80429	8.88	$714,210		
Chum	12945	1.93	$24,984		
Pink	29456	0.8	$23,565		
Sockeye	969	6.96	$6,744		
Alternative 2, Option 1			$941,200	$448,960.17	$943,041
Chinook	5544	30.97	$171,698		
Coho	80429	8.88	$714,210		
Chum	12945	1.93	$24,984		
Pink	29456	0.8	$23,565		
Sockeye	969	6.96	$6,744		
Alternative 3	0				
Petersburg					
Alternative 1			$1,718,015	$819,507.16	$1,721,375
Chinook	10546	30.97	$326,610		
Coho	145430	8.88	$1,291,418		
Chum	23407	1.93	$45,176		

Table D-8b. Worksheet for estimating direct personal income from SEAK salmon commercial fishery (1994-97 base).

Port/Alternative	HARVEST (number of fish)	VALUE PER FISH	HARVEST (EX-VESSEL) VALUE	DIRECT HARVESTOR INCOME	REGIONAL INCOME
Pink	53263	0.8	$42,610		
Sockeye	1753	6.96	$12,201		
Alternative 2, Option 1			$1,701,879	$811,810.46	$1,705,208
Chinook	10025	30.97	$310,474		
Coho	145430	8.88	$1,291,418		
Chum	23407	1.93	$45,176		
Pink	53263	0.8	$42,610		
Sockeye	1753	6.96	$12,201		
Alternative 3	0				
Kake					
Alternative 1			$490,855	$234,141.71	$491,815
Chinook	3013	30.97	$93,313		
Coho	41551	8.88	$368,973		
Chum	6688	1.93	$12,908		
Pink	15218	0.8	$12,174		
Sockeye	501	6.96	$3,487		
Alternative 2, Option 1			$486,240	$231,940.55	$487,191
Chinook	2864	30.97	$88,698		
Coho	41551	8.88	$368,973		
Chum	6688	1.93	$12,908		
Pink	15218	0.8	$12,174		
Sockeye	501	6.96	$3,487		
Alternative 3	0				
Wrangell					
Alternative 1			$213,853	$102,009.51	$214,271
Chinook	1313	30.97	$40,664		
Coho	18102	8.88	$160,746		
Chum	2913	1.93	$5,622		
Pink	6630	0.8	$5,304		
Sockeye	218	6.96	$1,517		
Alternative 2, Option 1			$211,840	$101,049.27	$212,254
Chinook	1248	30.97	$38,651		
Coho	18102	8.88	$160,746		
Chum	2913	1.93	$5,622		
Pink	6630	0.8	$5,304		
Sockeye	218	6.96	$1,517		
Alternative 3	0				
Sitka					
Alternative 1			$11,476,867	$5,474,559.55	$11,499,312
Chinook	70450	30.97	$2,181,837		
Coho	971521	8.88	$8,627,106		
Chum	156366	1.93	$301,786		
Pink	355812	0.8	$284,650		
Sockeye	11708	6.96	$81,488		
Alternative 2, Option 1			$11,369,215	$5,423,208.80	$11,391,450
Chinook	66974	30.97	$2,074,185		
Coho	971521	8.88	$8,627,106		
Chum	156366	1.93	$301,786		

Table D-8b. Worksheet for estimating direct personal income from SEAK salmon commercial fishery (1994-97 base).

Port/Alternative	HARVEST (number of fish)	VALUE PER FISH	HARVEST (EX-VESSEL) VALUE	DIRECT HARVESTOR INCOME	REGIONAL INCOME
Pink	355812	0.8	$284,650		
Sockeye	11708	6.96	$81,488		
Alternative 3	0				
Hoonah					
Alternative 1			$1,902,700	$907,603.60	$1,906,421
Chinook	11680	30.97	$361,730		
Coho	161063	8.88	$1,430,239		
Chum	25923	1.93	$50,031		
Pink	58988	0.8	$47,190		
Sockeye	1941	6.96	$13,509		
Alternative 2, Option 1			$1,884,831	$899,079.61	$1,888,517
Chinook	11103	30.97	$343,860		
Coho	161063	8.88	$1,430,239		
Chum	25923	1.93	$50,031		
Pink	58988	0.8	$47,190		
Sockeye	1941	6.96	$13,509		
Alternative 3					
Pelican					
Alternative 1			$1,227,160	$585,365.45	$1,229,560
Chinook	7533	30.97	$233,297		
Coho	103879	8.88	$922,446		
Chum	16719	1.93	$32,268		
Pink	38045	0.8	$30,436		
Sockeye	1252	6.96	$8,714		
Alternative 2, Option 1			$1,215,639	$579,869.91	$1,218,017
Chinook	7161	30.97	$221,776		
Coho	103879	8.88	$922,446		
Chum	16719	1.93	$32,268		
Pink	38045	0.8	$30,436		
Sockeye	1252	6.96	$8,714		
Alternative 3	0				
Elfin Cove					
Alternative 1			$398,516	$190,095.42	$399,295
Chinook	2446	30.97	$75,753		
Coho	33735	8.88	$299,567		
Chum	5430	1.93	$10,480		
Pink	12355	0.8	$9,884		
Sockeye	407	6.96	$2,833		
Alternative 2, Option 1			$394,800	$188,322.67	$395,572
Chinook	2326	30.97	$72,036		
Coho	33735	8.88	$299,567		
Chum	5430	1.93	$10,480		
Pink	12355	0.8	$9,884		
Sockeye	407	6.96	$2,833		
Alternative 3	0				
Juneau					
Alternative 1			$398,516	$190,095.42	$399,295

Table D-8b. Worksheet for estimating direct personal income from SEAK salmon commercial fishery (1994-97 base).

Port/Alternative	HARVEST (number of fish)	VALUE PER FISH	HARVEST (EX-VESSEL) VALUE	DIRECT HARVESTOR INCOME	REGIONAL INCOME
Chinook	2446	30.97	$75,753		
Coho	33735	8.88	$299,567		
Chum	5430	1.93	$10,480		
Pink	12355	0.8	$9,884		
Sockeye	407	6.96	$2,833		
Alternative 2, Option 1			$394,800	$188,322.67	$395,572
Chinook	2326	30.97	$72,036		$0
Coho	33735	8.88	$299,567		
Chum	5430	1.93	$10,480		
Pink	12355	0.8	$9,884		
Sockeye	407	6.96	$2,833		
Alternative 3					
Haines					
Alternative 1			$31,589	$15,068.27	$31,651
Chinook	194	30.97	$6,008		
Coho	2674	8.88	$23,745		
Chum	430	1.93	$830		
Pink	979	0.8	$783		
Sockeye	32	6.96	$223		
Alternative 2, Option 1			$31,279	$14,920.54	$31,341
Chinook	184	30.97	$5,698		
Coho	2674	8.88	$23,745		
Chum	430	1.93	$830		
Pink	979	0.8	$783		
Sockeye	32	6.96	$223		
Alternative 3					
Excursion Inlet					
Alternative 1			$2,393,564	$1,141,749.55	$2,398,245
Chinook	14693	30.97	$455,042		
Coho	202615	8.88	$1,799,221		
Chum	32611	1.93	$62,939		
Pink	74206	0.8	$59,365		
Sockeye	2442	6.96	$16,996		
Alternative 2, Option 1			$2,371,111	$1,131,039.17	$2,375,748
Chinook	13968	30.97	$432,589		
Coho	202615	8.88	$1,799,221		
Chum	32611	1.93	$62,939		
Pink	74206	0.8	$59,365		
Sockeye	2442	6.96	$16,996		
Alternative 3	0				
Gustavus					
Alternative 1			$60,758	$28,981.88	$60,876
Chinook	373	30.97	$11,552		
Coho	5143	8.88	$45,670		
Chum	828	1.93	$1,598		
Pink	1883	0.8	$1,506		
Sockeye	62	6.96	$432		
Alternative 2			$60,200	$28,715.97	$60,318

Table D-8b. Worksheet for estimating direct personal income from SEAK salmon commercial fishery (1994-97 base).

Port/Alternative	HARVEST (number of fish)	VALUE PER FISH	HARVEST (EX-VESSEL) VALUE	DIRECT HARVESTOR INCOME	REGIONAL INCOME
Chinook	355	30.97	$10,994		
Coho	5143	8.88	$45,670		
Chum	828	1.93	$1,598		
Pink	1883	0.8	$1,506		
Sockeye	62	6.96	$432		
Alternative 3	0				
Yakutat					
Alternative 1			$1,195,561	$570,292.56	$1,197,900
Chinook	7339	30.97	$227,289		
Coho	101204	8.88	$898,692		
Chum	16289	1.93	$31,438		
Pink	37065	0.8	$29,652		
Sockeye	1220	6.96	$8,491		
Alternative 2			$1,184,350	$564,944.75	$1,186,666
Chinook	6977	30.97	$216,078		
Coho	101204	8.88	$898,692		
Chum	16289	1.93	$31,438		
Pink	37065	0.8	$29,652		
Sockeye	1220	6.96	$8,491		
Alternative 3	0				
Alternative 1			$24,300,023	$11,591,310	$24,347,548
Alternative 2			$24,072,022	$11,482,552	$24,119,101
Notes					
All monetary values are reported in constant 1996 dollars.					
Regional income effects are not reported in the Public Draft EIS.					

D.4.2 Pacific Coast

The alternatives analyzed for the Pacific Coast assessment include Alternative 3—No Incidental Take and Alternative 2—Mark-Selective Fisheries, which has two options. Option A is based on the assumption that the number of fish encounters by commercial and sport fishers would remain the same. Option B assumes that the number of fish encounters would increase to take advantage of the opportunity to harvest more hatchery fish. The baseline conditions (Alternative 1) for the assessment is the average annual harvest and effort levels that occurred between 1988 and 1993 (Baseline 1) and between 1994 and 1997 (Baseline 2),as affected by more recent management policies to reduce the mortality of listed species.

D.4.2.1 Salmon Sport Fishery

NRC estimated the number of sport fishing trips by port area using a spreadsheet model developed from Council data. The spreadsheet model predicts the number of sport fishing trips out of each port area based on the number of days that the salmon season is assumed open for sport fishing and on the timing of the open season. Observed data on catch per unit of effort and catch levels during the two base periods

were used in the spreadsheet model to estimate effort. A more detailed description of the NRC spreadsheet model is included in Appendix E, Pacific Fishery Management Council Fishery Modeling, of the FPEIS.

Sport fishing effort (trips) were developed by NRC for 13 port areas along the Pacific Coast, including Monterey, San Francisco, Fort Bragg, Eureka, Crescent City, Brookings, Coos Bay, Newport, Tillamook, Columbia River, Gray's Harbor, La Push, Neah Bay. This information, which is presented in Table D-9, was used to quantify the following parameters:

- Net benefits (net willingness to pay) to ocean salmon anglers
- Gross and net income to sport fishing-related businesses
- Total (direct, indirect, and induced) personal income at the local (county) level

Net Benefits to Ocean Salmon Anglers

The net benefits to ocean salmon anglers, as measured by their net WTP for salmon fishing opportunities, were estimated based on average per trip values for sport fishing for salmon by harvest area, as reported by Thomson and Huppert (1987). An average value of $70 per trip (1996 dollars) was used for sport fishing for salmon from private boats and charterboats. This value was derived by adjusting the 1987 value using the consumer price index for the Pacific Coast.

Gross and Net Income to Sport Fishing-Related Businesses

Gross income to sport fishing-related businesses was approximated based on angler expenditures on sport fishing for salmon, which were estimated based on information from a 1991 study by The Research Group on sport fishing activity in Oregon. An average value ($57.15) was derived from spending profiles for resident anglers ($70.99) and nonresident anglers ($43.32) for ocean fishing for salmon. This 1989 value was converted to 1996 dollars using the consumer price index for the Pacific Coast (1.2516) to obtain the $71.52 value shown in Tables D-9a and D-9b.

The per-day spending profiles were used with the predicted number of salmon angler trips provided by NRC to estimate total spending associated with sport fishing for salmon (Tables D-9a and D-9b). The net income to affected sport fishing-related businesses was estimated based on a net income coefficient derived from data on proprietary income in the IMPLAN database for Clatsop, County, Oregon. A weighted average was estimated from five sport fishing-related sectors: food stores, food and beverage establishments, service stations and fuel, lodging, and miscellaneous retail trade. The relative amount of angler spending in these sectors, based on information reported by the U.S. Fish and Wildlife Service (1999) was used to weight the percentages for each sector. The resulting coefficient (11.6 percent) was applied to sport fishing-related revenues to estimate net income. These calculations are shown in Tables D-9a (Baseline 1) and D-9b (Baseline 2).

Table D-9a. Net income to sport fishing-related businesses (1988-93 base).					
Alternative 1					
WASHINGTON PORTS					
	Trips	Spending per Trip	Total Spending	Net Income Coefficient	Net Income
Neah Bay	9,060	71.52	647971.2	0.116	$75,165
La Push	953	71.52	68158.56	0.116	$7,906
Grays Harbor	17,635	71.52	1261255.2	0.116	$146,306
Columbia River-Washington	11,845	71.52	847154.4	0.116	$98,270
STATE TOTAL	39,493	71.52	2824539.36	0.116	$327,647
OREGON PORTS					
Columbia River-Oregon	7,897	71.52	564793.44	0.116	$65,516
Tillamook	12,685	71.52	907231.2	0.116	$105,239
Newport	30,879	71.52	2208466.08	0.116	$256,182
Coos Bay	27,691	71.52	1980460.32	0.116	$229,733
Brookings	7,540	71.52	539260.8	0.116	$62,554
STATE TOTAL					
CALIFORNIA PORTS					
Crescent City	5,173	71.52	369972.96	0.116	$42,917
Eureka	5,152	71.52	368471.04	0.116	$42,743
Fort Bragg	12,526	71.52	895859.52	0.116	$103,920
San Francisco	61,815	71.52	4421008.8	0.116	$512,837
Monterey	35,137	71.52	2512998.24	0.116	$291,508
STATE TOTAL					
Alternative 2					
WASHINGTON PORTS					
Neah Bay	28,503	71.52	2038534.56	0.116	$236,470
La Push	2,998	71.52	214416.96	0.116	$24,872
Grays Harbor	55,482	71.52	3968072.64	0.116	$460,296
Columbia River-Washington	37,267	71.52	2665335.84	0.116	$309,179
STATE TOTAL					
OREGON PORTS					
Columbia River-Oregon	24844	71.52	1776842.88	0.116	$206,114
Tillamook	25,793	71.52	1844715.36	0.116	$213,987
Newport	62,789	71.52	4490669.28	0.116	$520,918
Coos Bay	56,307	71.52	4027076.64	0.116	$467,141
Brookings	42,242	71.52	3021147.84	0.116	$350,453

Table D-9a. Net income to sport fishing-related businesses (1988-93 base).					
STATE TOTAL					
CALIFORNIA PORTS					
Crescent City	28,979	71.52	2072578.08	0.116	$240,419
Eureka	28,860	71.52	2064067.2	0.116	$239,432
Fort Bragg	12,526	71.52	895859.52	0.116	$103,920
San Francisco	61,815	71.52	4421008.8	0.116	$512,837
Monterey	35,137	71.52	2512998.24	0.116	$291,508
STATE TOTAL					
Alternative 2, Option 2					
WASHINGTON PORTS					
Neah Bay	9060	71.52	647971.2	0.116	$75,165
La Push	953	71.52	68158.56	0.116	$7,906
Grays Harbor	17635	71.52	1261255.2	0.116	$146,306
Columbia River-Washington	11845	71.52	847154.4	0.116	$98,270
STATE TOTAL					
OREGON PORTS					
Columbia River-Oregon	7897	71.52	564793.44	0.116	$65,516
Tillamook	12794	71.52	915026.88	0.116	$106,143
Newport	31144	71.52	2227418.88	0.116	$258,381
Coos Bay	27929	71.52	1997482.08	0.116	$231,708
Brookings	7540	71.52	539260.8	0.116	$62,554
STATE TOTAL					
CALIFORNIA PORTS					
Crescent City	5173	71.52	369972.96	0.116	$42,917
Eureka	5152	71.52	368471.04	0.116	$42,743
Fort Bragg	12526	71.52	895859.52	0.116	$103,920
San Francisco	61815	71.52	4421008.8	0.116	$512,837
Monterey	35137	71.52	2512998.24	0.116	$291,508
STATE TOTAL					

Table D-9b. Net income to sport fishing-related businesses (1994-97 base).					
Alternative 1					
WASHINGTON PORTS					
	Trips	Spending per Trip	Total Spending	Net Income Coefficient	Net Income
Neah Bay	4,372	71.52	312685.44	0.116	$36,272
La Push	584	71.52	41767.68	0.116	$4,845
Grays Harbor	8,073	71.52	577380.96	0.116	$66,976
Columbia River-Washington	7,558	71.52	540548.16	0.116	$62,704
STATE TOTAL	20,587	71.52	1472382.24	0.116	$170,796
OREGON PORTS					
Columbia River-Oregon	5,039	71.52	360389.28	0.116	$41,805
Tillamook	6,993	71.52	500139.36	0.116	$58,016
Newport	17,023	71.52	1217484.96	0.116	$141,228
Coos Bay	15,266	71.52	1091824.32	0.116	$126,652
Brookings	4,717	71.52	337359.84	0.116	$39,134
STATE TOTAL					
CALIFORNIA PORTS					
Crescent City	3,236	71.52	231438.72	0.116	$26,847
Eureka	3,223	71.52	230508.96	0.116	$26,739
Fort Bragg	20,994	71.52	1501490.88	0.116	$174,173
San Francisco	103,605	71.52	7409829.6	0.116	$859,540
Monterey	58,892	71.52	4211955.84	0.116	$488,587
STATE TOTAL		71.52			
Alternative 2, Option 1					
WASHINGTON PORTS					
Neah Bay	24,825	71.52	1775484	0.116	$205,956
La Push	2,611	71.52	186738.72	0.116	$21,662
Grays Harbor	48,323	71.52	3456060.96	0.116	$400,903
Columbia River-Washington	32,458	71.52	2321396.16	0.116	$269,282
STATE TOTAL					
OREGON PORTS					
Columbia River-Oregon	21639	71.52	1547621.28	0.116	$179,524

Table D-9b. Net income to sport fishing-related businesses (1994-97 base).					
Tillamook	25,793	71.52	1844715.36	0.116	$213,987
Newport	62,789	71.52	4490669.28	0.116	$520,918
Coos Bay	56,307	71.52	4027076.64	0.116	$467,141
Brookings	35,022	71.52	2504773.44	0.116	$290,554
STATE TOTAL					
CALIFORNIA PORTS					
Crescent City	24,026	71.52	1718339.52	0.116	$199,327
Eureka	23,928	71.52	1711330.56	0.116	$198,514
Fort Bragg	20,994	71.52	1501490.88	0.116	$174,173
San Francisco	103,605	71.52	7409829.6	0.116	$859,540
Monterey	58,892	71.52	4211955.84	0.116	$488,587
STATE TOTAL					
Alternative 2, Option 2					
WASHINGTON PORTS					
Neah Bay	5512	71.52	394218.24	0.116	$45,729
La Push	580	71.52	41481.6	0.116	$4,812
Grays Harbor	10728	71.52	767266.56	0.116	$89,003
Columbia River-Washington	7206	71.52	515373.12	0.116	$59,783
STATE TOTAL					
OREGON PORTS					
Columbia River-Oregon	4804	71.52	343582.08	0.116	$39,856
Tillamook	9079	71.52	649330.08	0.116	$75,322
Newport	22101	71.52	1580663.52	0.116	$183,357
Coos Bay	19819	71.52	1417454.88	0.116	$164,425
Brookings	4717	71.52	337359.84	0.116	$39,134
STATE TOTAL					
CALIFORNIA PORTS					
Crescent City	3236	71.52	231438.72	0.116	$26,847
Eureka	3223	71.52	230508.96	0.116	$26,739
Fort Bragg	20994	71.52	1501490.88	0.116	$174,173
San Francisco	103605	71.52	7409829.6	0.116	$859,540
Monterey	58892	71.52	4211955.84	0.116	$488,587
STATE TOTAL					

Total Personal Income at the County Level from Salmon Sport Fishing

Total (direct, indirect, and induced) personal income generated by salmon angler spending was estimated based on personal income multipliers applied to the predicted number of sport fishing trips for salmon. Total personal income effects include the impacts on businesses that supply goods and services to sport fishing-related businesses (e.g., bait and tackle stores, marinas, sporting good stores, etc.), as well as the induced effects in the local economy from spending of the wages and salaries earned. The multipliers were obtained from the Council (Seger, personal communication), which uses them to conduct its annual review of the ocean salmon fisheries. The multipliers were derived from information compiled for the Fishery Economic Assessment Model developed by Shannon Davis and Hans Radtke of The Research Group, and others. As shown in Tables D-10a and D-10b, port-specific multipliers were used in the analysis.

It should be noted that the analytical procedures used to estimate total personal income effects do not differentiate between spending by resident and nonresident anglers. From a local or regional economic impact perspective, this distinction is important because spending by anglers who live outside the region of interest represents "new" income to the region, whereas spending by residents of the region is primarily income that is re-directed from other activities within the region. This distinction could not be accurately accounted for in the analysis because of limited data on the relative proportion of resident and nonresident anglers and on spending patterns of resident anglers. The impact on the analysis of not accounting for this effect is that the estimates of changes in direct personal income are overstated, probably by 20 percent to 30 percent.

State income coefficients provided by the Council also were used to estimate total personal income at the state level. The results of this analysis also are presented in Tables D-10a and D-10b, but are not presented in the FPEIS, as noted in the tables.

D.4.2.2 Commercial Salmon Fishery

NRC developed estimates of chinook and coho harvest and ex-vessel value for the 13 port areas along the Pacific Coast (Tables D-11a and D-11b) using a spreadsheet model developed from Council data. The spreadsheet model, which is described in Appendix E, Pacific Fishery Management Council Fishery Modeling, of the FPEIS incorporates assumptions about the number of days that the season is open for a particular species and the timing of these openings. Observed data on harvest per unit of effort and level of effort during the two base periods were used in the calculations. Modeling results were used to quantify the following parameters:

- Net income (profits) to commercial salmon fishers, by port area
- Total (direct, indirect, and induced) personal income at the local (county) level

Net Income to Commercial Salmon Fishers

The net income (profits) to commercial salmon fishers was estimated based on a net income coefficient derived from the 1992 IMPLAN database. Information on proprietary income in the commercial fishing sector (all species) was reviewed for different west coast regions from Monterey, California, to the Oregon/Washington boundary. Proprietary income as a percentage of direct income ranged from a low of

Table D-10a. Personal income at the local level - Salmon Sport Fishery (1988-93 base)

Port Area/Alternative	TRIPS	INCOME/TRIP	LOCAL INCOME	STATE INC COEF	STATE INCOME
Neah Bay					
Alternative 1	9060		377530.07		510798.1847
Private boat	8288	37.42	310136.96	1.353	419615.3069
Charter boat	771	87.41	67393.11	1.353	91182.87783
Alternative 2, Option 1	28503		1187858		1607171.874
Private boat	26077	37.42	975801.34	1.353	1320259.213
Charter boat	2426	87.41	212056.66	1.353	286912.661
Alternative 2, Option 2	9060		377530.07		510798.1847
Private boat	8288	37.42	310136.96	1.353	419615.3069
Charter boat	771	87.41	67393.11	1.353	91182.87783
Alternative 3	0		0		0
La Push					
Alternative 1	953		37010.99		50075.86947
Private boat	926	37.42	34650.92	1.353	46882.69476
Charter boat	27	87.41	2360.07	1.353	3193.17471
Alternative 2, Option 1	2998		116484.3		157603.2579
Private boat	2912	37.42	108967.04	1.353	147432.4051
Charter boat	86	87.41	7517.26	1.353	10170.85278
Alternative 2, Option 2	953		37010.99		50075.86947
Private boat	926	37.42	34650.92	1.353	46882.69476
Charter boat	27	87.41	2360.07	1.353	3193.17471
Alternative 3	0		0		0
Grays Harbor					
Alternative 1	17635		1219557.66		1650061.514
Private boat	7182	38.67	277727.94	1.353	375765.9028
Charter boat	10452	90.11	941829.72	1.353	1274295.611
Alternative 2, Option 1	55482		3837132.01		5191639.61
Private boat	22598	38.67	873864.66	1.353	1182338.885
Charter boat	32885	90.11	2963267.35	1.353	4009300.725
Alternative 2, Option 2	17635		1219557.66		1650061.514
Private boat	7182	38.67	277727.94	1.353	375765.9028
Charter boat	10452	90.11	941829.72	1.353	1274295.611
Alternative 3	0		0		0
Columbia River-Washington					

Table D-10a. Personal income at the local level - Salmon Sport Fishery (1988-93 base)					
Alternative 1	11845		707640.98		921348.556
Private boat	7647	40.6	310468.2	1.302	404229.5964
Charter boat	4198	94.61	397172.78	1.302	517118.9596
Alternative 2, Option 1	59627		2226309.67		2898655.19
Private boat	24059	40.6	976795.4	1.302	1271787.611
Charter boat	13207	94.61	1249514.27	1.302	1626867.58
Alternative 2, Option 2	11845		707640.98		921348.556
Private boat	7647	40.6	310468.2	1.302	404229.5964
Charter boat	4198	94.61	397172.78	1.302	517118.9596
Alternative 3	0		0		0
Columbia River-Oregon					
Alternative 1	7897		471697.58		614150.2492
Private boat	5098	40.6	206978.8	1.302	269486.3976
Charter boat	2798	94.61	264718.78	1.302	344663.8516
Alternative 2, Option 1	2484		1484265.05		1932513.095
Private boat	16040	40.6	651224	1.302	847893.648
Charter boat	8805	94.61	833041.05	1.302	1084619.447
Alternative 2, Option 2	7897		471697.58		614150.2492
Private boat	5098	40.6	206978.8	1.302	269486.3976
Charter boat	2798	94.61	264718.78	1.302	344663.8516
Alternative 3	0		0		0
Tillamook					
Alternative 1	12685		587116.28		764425.3966
Private boat	10691	38.28	409251.48	1.302	532845.427
Charter boat	1994	89.2	177864.8	1.302	231579.9696
Alternative 2, Option 1	25793		1193785.72		1554309.007
Private boat	21739	38.28	832168.92	1.302	1083483.934
Charter boat	4054	89.2	361616.8	1.302	470825.0736
Alternative 2, Option 2	12794		592154.44		770985.0809
Private boat	10783	38.28	412773.24	1.302	537430.7585
Charter boat	2011	89.2	179381.2	1.302	233554.3224
Alternative 3	0		0		0
Newport					
Alternative 1	30879		1746916.61		2274485.426
Private boat	20132	38.67	778504.44	1.302	1013612.781
Charter boat	10747	90.11	968412.17	1.302	1260872.645
Alternative 2, Option 1	62789		3552168.95		4624923.973
Private boat	40936	38.67	1582995.12	1.302	2061059.646
Charter boat	21853	90.11	1969173.83	1.302	2563864.327
Alternative 2, Option 2	31144		1761896.64		2293989.425
Private boat	20305	38.67	785194.35	1.302	1022323.044
Charter boat	10839	90.11	976702.29	1.302	1271666.382
Alternative 3	0		0		0

Table D-10a. Personal income at the local level - Salmon Sport Fishery (1988-93 base)					
Coos Bay					
Alternative 1	27691		1363488.17		1775261.597
Private boat	22773	39.83	907048.59	1.302	1180977.264
Charter boat	4918	92.81	456439.58	1.302	594284.3332
Alternative 2, Option 1	56307		2772507.81		3609805.169
Private boat	46307	39.83	1844407.81	1.302	2401418.969
Charter boat	10000	92.81	928100	1.302	1208386.2
Alternative 2, Option 2	27929		1375192.87		1790501.117
Private boat	22969	39.83	914855.27	1.302	1191141.562
Charter boat	4960	92.81	460337.6	1.302	599359.5552
Alternative 3	0		0		0
Port Area/Alternative	TRIPS	INCOME/TRIP	LOCAL INCOME	STATE INC COEF	STATE INCOME
Brookings					
Alternative 1	7540		293478.42		382108.9028
Private boat	7142	36.36	259683.12	1.302	338107.4222
Charter boat	399	84.7	33795.3	1.302	44001.4806
Alternative 2, Option 1	42242		1643862.34		2140308.767
Private boat	40009	36.36	1454727.24	1.302	1894054.866
Charter boat	2233	84.7	189135.1	1.302	246253.9002
Alternative 2, Option 2	7540		293478.42		382108.9028
Private boat	7142	36.36	259683.12	1.302	338107.4222
Charter boat	399	84.7	33795.3	1.302	44001.4806
Alternative 3	0		0		0
Crescent City					
Alternative 1	5173		238773.32		318284.8356
Private boat	5057	44.86	226857.02	1.333	302400.4077
Charter boat	115	103.62	11916.3	1.333	15884.4279
Alternative 2, Option 1	28979		1338015.66		1783574.875
Private boat	28332	44.86	1270973.52	1.333	1694207.702
Charter boat	647	103.62	67042.14	1.333	89367.17262
Alternative 2, Option 2	5173		238773.32		318284.8356
Private boat	5057	44.86	226857.02	1.333	302400.4077
Charter boat	115	103.62	11916.3	1.333	15884.4279
Alternative 3	0		0		0
Eureka					
Alternative 1	5152		256810.74		342328.7164
Private boat	4713	44.86	211425.18	1.333	281829.7649
Charter boat	438	103.62	45385.56	1.333	60498.95148
Alternative 2, Option 1	28860		1438915.4		1918074.228
Private boat	26405	44.86	1184528.3	1.333	1578976.224
Charter boat	2455	103.62	254387.1	1.333	339098.0043
Alternative 2, Option 2	5152		256810.74		342328.7164
Private boat	4713	44.86	211425.18	1.333	281829.7649

Table D-10a. Personal income at the local level - Salmon Sport Fishery (1988-93 base)					
Charter boat	438	103.62	45385.56	1.333	60498.95148
Alternative 3	0		0		0
Fort Bragg					
Alternative 1	12526		716807.72		955504.6908
Private boat	9890	44.86	443665.4	1.333	591405.9782
Charter boat	2636	103.62	273142.32	1.333	364098.7126
Alternative 2, Option 1	12526		716807.72		955504.6908
Private boat	9890	44.86	443665.4	1.333	591405.9782
Charter boat	2636	103.62	273142.32	1.333	364098.7126
Alternative 2, Option 2	12526		716807.72		955504.6908
Private boat	9890	44.86	443665.4	1.333	591405.9782
Charter boat	2636	103.62	273142.32	1.333	364098.7126
Alternative 3	0		0		0
Monterey					
Alternative 1	35137		2961008.89		3947024.85
Private boat	10614	43.7	463831.8	1.333	618287.7894
Charter boat	24523	101.83	2497177.09	1.333	3328737.061
Alternative 2, Option 1	35137		2961008.89		3947024.85
Private boat	10614	43.7	463831.8	1.333	618287.7894
Charter boat	24523	101.83	2497177.09	1.333	3328737.061
Alternative 2, Option 2	35137		2961008.89		3947024.85
Private boat	10614	43.7	463831.8	1.333	618287.7894
Charter boat	24523	101.83	2497177.09	1.333	3328737.061
Alternative 3	0		0		0
San Francisco					
Alternative 1	61815		4620082.38		6158569.813
Private boat	45036	54.92	2473377.12	1.333	3297011.701
Charter boat	16779	127.94	2146705.26	1.333	2861558.112
Alternative 2, Option 1	61815		4620082.38		6158569.813
Private boat	45036	54.92	2473377.12	1.333	3297011.701
Charter boat	16779	127.94	2146705.26	1.333	2861558.112
Alternative 2, Option 2	61815		4620027.46		6158496.604
Private boat	45035	54.92	2473322.2	1.333	3296938.493
Charter boat	16779	127.94	2146705.26	1.333	2861558.112
Alternative 3	0		0		0
Notes					
All monetary values are reported in constant 1996 dollars.					
State personal income effects are not reported in the Public Draft EIS.					

Table D-10b. Personal income at the local level - Salmon Sport Fishery (1994-97 base).

Port/Alternative	TRIPS	INCOME/TRIP	LOCAL INCOME	STATE INC COEF	STATE INCOME
Neah Bay					
Alternative 1	4372		169799		229738.047
Private boat	4248	37.42	158960.16	1.353	215073.0965
Charter boat	124	87.41	10838.84	1.353	14664.95052
Alternative 2, Option 1	24825		964044.48		1304352.181
Private boat	24123	37.42	902682.66	1.353	1221329.639
Charter boat	702	87.41	61361.82	1.353	83022.54246
Alternative 2, Option 2	5512		214057.48		289619.7704
Private boat	5356	37.42	200421.52	1.353	271170.3166
Charter boat	156	87.41	13635.96	1.353	18449.45388
Alternative 3			0		0
La Push					
Alternative 1	584		24052.84		32543.49252
Private boat	540	37.42	20206.8	1.353	27339.8004
Charter boat	44	87.41	3846.04	1.353	5203.69212
Alternative 2, Option 1	2611		107751.61		145787.9283
Private boat	2410	37.42	90182.2	1.353	122016.5166
Charter boat	201	87.41	17569.41	1.353	23771.41173
Alternative 2, Option 2	580		23953.15		32408.61195
Private boat	535	37.42	20019.7	1.353	27086.6541
Charter boat	45	87.41	3933.45	1.353	5321.95785
Alternative 3			0		0
Grays Harbor					
Alternative 1	8073		563621.63		762580.0654
Private boat	3185	38.67	123163.95	1.353	166640.8244
Charter boat	4888	90.11	440457.68	1.353	595939.241
Alternative 2, Option 1	48323		3373836.25		4564800.446
Private boat	19062	38.67	737127.54	1.353	997333.5616
Charter boat	29261	90.11	2636708.71	1.353	3567466.885
Alternative 2, Option 2	10728		749006		1013405.118
Private boat	4232	38.67	163651.44	1.353	221420.3983
Charter boat	6496	90.11	585354.56	1.353	791984.7197
Alternative 3			0		0
Columbia River-Washington					
Alternative 1	7558		433332.81		564199.3186
Private boat	5218	40.6	211850.8	1.302	275829.7416
Charter boat	2341	94.61	221482.01	1.302	288369.577
Alternative 2, Option 1	32458		1860649.31		2422565.402
Private boat	22407	40.6	909724.2	1.302	1184460.908
Charter boat	10051	94.61	950925.11	1.302	1238104.493

Table D-10b. Personal income at the local level - Salmon Sport Fishery (1994-97 base).					
Alternative 2, Option 2	7206		413059.91		537804.0028
Private boat	4975	40.6	201985	1.302	262984.47
Charter boat	2231	94.61	211074.91	1.302	274819.5328
Alternative 3			0		0
Columbia River-Oregon					
Alternative 1	5039		288798.4		376015.5168
Private boat	3478	40.6	141206.8	1.302	183851.2536
Charter boat	1560	94.61	147591.6	1.302	192164.2632
Alternative 2, Option 1	21639		1240464.41		1615084.662
Private boat	14938	40.6	606482.8	1.302	789640.6056
Charter boat	6701	94.61	633981.61	1.302	825444.0562
Alternative 2, Option 2	4804		275409.28		358582.8826
Private boat	3316	40.6	134629.6	1.302	175287.7392
Charter boat	1488	94.61	140779.68	1.302	183295.1434
Alternative 3			0		0
Tillamook					
Alternative 1	6993		313163.6		407739.0072
Private boat	6100	38.28	233508	1.302	304027.416
Charter boat	893	89.2	79655.6	1.302	103711.5912
Alternative 2, Option 1	25793		1155137.44		1503988.947
Private boat	22498	38.28	861223.44	1.302	1121312.919
Charter boat	3295	89.2	293914	1.302	382676.028
Alternative 2, Option 2	9079		406611.32		529407.9386
Private boat	7919	38.28	303139.32	1.302	394687.3946
Charter boat	1160	89.2	103472	1.302	134720.544
Alternative 3			0		0
Newport					
Alternative 1	17023		1340631.01		1745501.575
Private boat	3758	38.67	145321.86	1.302	189209.0617
Charter boat	13265	90.11	1195309.15	1.302	1556292.513
Alternative 2, Option 1	62789		4944765.4		6438084.551
Private boat	13862	38.67	536043.54	1.302	697928.6891
Charter boat	48926	90.11	4408721.86	1.302	5740155.862
Alternative 2, Option 2	22101		1740545.35		2266190.046
Private boat	4879	38.67	188670.93	1.302	245649.5509
Charter boat	17222	90.11	1551874.42	1.302	2020540.495
Alternative 3			0		0
Coos Bay					
Alternative 1	15266		626005		815058.51
Private boat	14927	39.83	594542.41	1.302	774094.2178
Charter boat	339	92.81	31462.59	1.302	40964.29218
Alternative 2, Option 1	56307		2308945.96		3006247.64
Private boat	55055	39.83	2192840.65	1.302	2855078.526

Table D-10b. Personal income at the local level - Salmon Sport Fishery (1994-97 base).					
Charter boat	1251	92.81	116105.31	1.302	151169.1136
Alternative 2, Option 2	19819		812701.97		1058137.965
Private boat	19379	39.83	771865.57	1.302	1004968.972
Charter boat	440	92.81	40836.4	1.302	53168.9928
Alternative 3			0		0
Port/Alternative	TRIPS	INCOME/TRIP	LOCAL INCOME	STATE INC COEF	STATE INCOME
Brookings					
Alternative 1	4717		176344.12		229600.0442
Private boat	4617	36.36	167874.12	1.302	218572.1042
Charter boat	100	84.7	8470	1.302	11027.94
Alternative 2, Option 1	35022		1309316.54		1704730.135
Private boat	34279	36.36	1246384.44	1.302	1622792.541
Charter boat	743	84.7	62932.1	1.302	81937.5942
Alternative 2, Option 2	4717		176344.12		229600.0442
Private boat	4617	36.36	167874.12	1.302	218572.1042
Charter boat	100	84.7	8470	1.302	11027.94
Alternative 3			0		0
Crescent City					
Alternative 1	3236		156155.08		208154.7216
Private boat	3049	44.86	136778.14	1.333	182325.2606
Charter boat	187	103.62	19376.94	1.333	25829.46102
Alternative 2, Option 1	24026		1159424		1545512.192
Private boat	22637	44.86	1015495.82	1.333	1353655.928
Charter boat	1389	103.62	143928.18	1.333	191856.2639
Alternative 2, Option 2	3236		156155.08		208154.7216
Private boat	3049	44.86	136778.14	1.333	182325.2606
Charter boat	187	103.62	19376.94	1.333	25829.46102
Alternative 3			0		0
Eureka					
Alternative 1	3223		154102.9		205419.1657
Private boat	3061	44.86	137316.46	1.333	183042.8412
Charter boat	162	103.62	16786.44	1.333	22376.32452
Alternative 2, Option 1	23928		1144039.6		1525004.787
Private boat	22726	44.86	1019488.36	1.333	1358977.984
Charter boat	1202	103.62	124551.24	1.333	166026.8029
Alternative 2, Option 2	3223		154102.9		205419.1657
Private boat	3061	44.86	137316.46	1.333	183042.8412
Charter boat	162	103.62	16786.44	1.333	22376.32452
Alternative 3			0		0
Fort Bragg					
Alternative 1	20994		1093215.36		1457256.075
Private boat	18417	44.86	826186.62	1.333	1101306.764

Table D-10b. Personal income at the local level - Salmon Sport Fishery (1994-97 base).					
Charter boat	2577	103.62	267028.74	1.333	355949.3104
Alternative 2, Option 1	20994		1093215.36		1457256.075
Private boat	18417	44.86	826186.62	1.333	1101306.764
Charter boat	2577	103.62	267028.74	1.333	355949.3104
Alternative 2, Option 2	20994		1093215.36		1457256.075
Private boat	18417	44.86	826186.62	1.333	1101306.764
Charter boat	2577	103.62	267028.74	1.333	355949.3104
Alternative 3			0		0
Monterey					
Alternative 1	58892		4561858.92		6080957.94
Private boat	24688	43.7	1078865.6	1.333	1438127.845
Charter boat	34204	101.83	3482993.32	1.333	4642830.096
Alternative 2, Option 1	58892		4561858.92		6080957.94
Private boat	24688	43.7	1078865.6	1.333	1438127.845
Charter boat	34204	101.83	3482993.32	1.333	4642830.096
Alternative 2, Option 2	58892		4561858.92		6080957.94
Private boat	24688	43.7	1078865.6	1.333	1438127.845
Charter boat	34204	101.83	3482993.32	1.333	4642830.096
Alternative 3			0		0
San Francisco					
Alternative 1	103605		8249702.7		10996853.7
Private boat	68550	54.92	3764766	1.333	5018433.078
Charter boat	35055	127.94	4484936.7	1.333	5978420.621
Alternative 2, Option 1	103605		8249702.7		10996853.7
Private boat	68550	54.92	3764766	1.333	5018433.078
Charter boat	35055	127.94	4484936.7	1.333	5978420.621
Alternative 2, Option 2	103605		8249702.7		10996853.7
Private boat	68550	54.92	3764766	1.333	5018433.078
Charter boat	35055	127.94	4484936.7	1.333	5978420.621
Alternative 3			0		0
Notes					
All monetary values are reported in constant 1996 dollars.					
State personal income effects are not reported in the Public Draft EIS.					

Table D-11a. Personal income at the local level - commercial salmon fishery (1988-93 base).					
Port/Alternative	HARVEST VALUE	LOCAL INCOME FACTOR	LOCAL INCOME	STATE INCOME COEF	STATE INCOME
Neah Bay					
Alternative 1	30700		93696.4		115715.054
Chinook	30700	3.052	93696.4	1.235	115715.054
Coho	0	1.411	0	1.235	0
Alternative 2, Option 1	295000		841428.1		1039163.704
Chinook	259100	3.052	790773.2	1.235	976604.902
Coho	35900	1.411	50654.9	1.235	62558.8015
Alternative 2, Option 2	27800		75984.2		93840.487
Chinook	22400	3.052	68364.8	1.235	84430.528
Coho	5400	1.411	7619.4	1.235	9409.959
Alternative 3	0		0		0
La Push					
Alternative 1	9300		28383.6		35053.746
Chinook	9300	3.052	28383.6	1.235	35053.746
Coho	0	1.411	0	1.235	0
Alternative 2, Option 1	84000		247342.5		305467.9875
Chinook	78500	3.052	239582	1.235	295883.77
Coho	5500	1.411	7760.5	1.235	9584.2175
Alternative 2, Option 2	7600		21882.4		27024.764
Chinook	6800	3.052	20753.6	1.235	25630.696
Coho	800	1.411	1128.8	1.235	1394.068
Alternative 3	0		0		0
Grays Harbor					
Alternative 1	41400		126352.8		156045.708
Chinook	41400	3.052	126352.8	1.235	156045.708
Coho	0	1.411	0	1.235	0
Alternative 2, Option 1	368200		1093387.9		1350334.057
Chinook	349700	3.052	1067284.4	1.235	1318096.234
Coho	18500	1.411	26103.5	1.235	32237.8225
Alternative 2, Option 2	33000		96121.2		118709.682
Chinook	30200	3.052	92170.4	1.235	113830.444
Coho	2800	1.411	3950.8	1.235	4879.238
Alternative 3	0		0		0
Columbia River-Washington					
Alternative 1	4320		4968		5842.368
Chinook	4320	1.15	4968	1.176	5842.368
Coho	0	1.319	0	1.176	0
Alternative 2, Option 1	55020		66406.26		78093.76176
Chinook	36480	1.15	41952	1.176	49335.552
Coho	18540	1.319	24454.26	1.176	28758.20976
Alternative 2, Option 2	6000		7376.58		8674.85808
Chinook	3180	1.15	3657	1.176	4300.632
Coho	2820	1.319	3719.58	1.176	4374.22608
Alternative 3	0		0		0
Columbia River-Oregon					
Alternative 1	2880		3312		3894.912

Table D-11a. Personal income at the local level - commercial salmon fishery (1988-93 base).					
Chinook	2880	1.15	3312	1.176	3894.912
Coho	0	1.319	0	1.176	0
Alternative 2, Option 1	36680		44270.84		52062.50784
Chinook	24320	1.15	27968	1.176	32890.368
Coho	12360	1.319	16302.84	1.176	19172.13984
Alternative 2, Option 2	4000		4917.72		5783.23872
Chinook	2120	1.15	2438	1.176	2867.088
Coho	1880	1.319	2479.72	1.176	2916.15072
Alternative 3	0		0		0
Tillamook					
Alternative 1	262900		892282.6		1088584.772
Chinook	262900	3.394	892282.6	1.22	1088584.772
Coho	0	1.36	0	1.22	0
Alternative 2, Option 1	570100		1432724.8		1747924.256
Chinook	323200	3.394	1096940.8	1.22	1338267.776
Coho	246900	1.36	335784	1.22	409656.48
Alternative 2, Option 2	235600		786608.8		959662.736
Chinook	229200	3.394	777904.8	1.22	949043.856
Coho	6400	1.36	8704	1.22	10618.88
Alternative 3	0		0		0
Newport					
Alternative 1	1117400		3461705.2		4275205.922
Chinook	1117400	3.098	3461705.2	1.235	4275205.922
Coho	0	1.36	0	1.235	0
Alternative 2, Option 1	1674000		4664130.6		5760201.291
Chinook	1373700	3.098	4255722.6	1.235	5255817.411
Coho	300300	1.36	408408	1.235	504383.88
Alternative 2, Option 2	1052200		3124325.4		3858541.869
Chinook	974300	3.098	3018381.4	1.235	3727701.029
Coho	77900	1.36	105944	1.235	130840.84
Alternative 3	0		0		0
Coos Bay					
Alternative 1	1936800		6120288		6848602.272
Chinook	1936800	3.16	6120288	1.119	6848602.272
Coho	0	1.36	0	1.119	0
Alternative 2, Option 1	2653900		7895284		8834822.796
Chinook	2381100	3.16	7524276	1.119	8419664.844
Coho	272800	1.36	371008	1.119	415157.952
Alternative 2, Option 2	1759500		5432760		6079258.44
Chinook	1688800	3.16	5336608	1.119	5971664.352
Coho	70700	1.36	96152	1.119	107594.088
Alternative 3	0		0		0
Port/Alternative	HARVEST VALUE	LOCAL INCOME FACTOR	LOCAL INCOME	STATE INCOME COEF	STATE INCOME
Brookings					
Alternative 1	94200		329323.2		406714.152
Chinook	94200	3.496	329323.2	1.235	406714.152
Coho	0		0	1.235	0
Alternative 2, Option 1	169000		590824		729667.64
Chinook	169000	3.496	590824	1.235	729667.64

Table D-11a. Personal income at the local level - commercial salmon fishery (1988-93 base).					
Coho	0		0	1.235	0
Alternative 2, Option 2	68200		238427.2		294457.592
Chinook	68200	3.496	238427.2	1.235	294457.592
Coho	0		0	1.235	0
Alternative 3	0		0		0
Crescent City					
Alternative 1	39800		151876.8		180733.392
Chinook	39800	3.816	151876.8	1.19	180733.392
Coho	0		0	1.19	0
Alternative 2, Option 1	71400		272462.4		324230.256
Chinook	71400	3.816	272462.4	1.19	324230.256
Coho	0		0	1.19	0
Alternative 2, Option 2	28800		109900.8		130781.952
Chinook	28800	3.816	109900.8	1.19	130781.952
Coho	0		0	1.19	0
Alternative 3	0		0		0
Eureka					
Alternative 1	125700		484573.5		576642.465
Chinook	125700	3.855	484573.5	1.19	576642.465
Coho	0		0	1.19	0
Alternative 2, Option 1	225400		868917		1034011.23
Chinook	225400	3.855	868917	1.19	1034011.23
Coho	0		0	1.19	0
Alternative 2, Option 2	91000		350805		417457.95
Chinook	91000	3.855	350805	1.19	417457.95
Coho	0		0	1.19	0
Alternative 3	0		0		0
Fort Bragg					
Alternative 1	3322400		11718104.8		13944544.71
Chinook	3322400	3.527	11718104.8	1.19	13944544.71
Coho	0		0	1.19	0
Alternative 2, Option 1	2480600		8749076.2		10411400.68
Chinook	2480600	3.527	8749076.2	1.19	10411400.68
Coho	0		0	1.19	0
Alternative 2, Option 2	2480600		8749076.2		10411400.68
Chinook	2480600	3.527	8749076.2	1.19	10411400.68
Coho	0		0	1.19	0
Alternative 3	0		0		0
Monterey					
Alternative 1	3422500		11513290		13240283.5
Chinook	3422500	3.364	11513290	1.15	13240283.5
Coho	0		0	1.15	0
Alternative 2, Option 1	2555300		8596029.2		9885433.58
Chinook	2555300	3.364	8596029.2	1.15	9885433.58
Coho	0		0	1.15	0
Alternative 2, Option 2	2555300		8596029.2		9885433.58
Chinook	2555300	3.364	8596029.2	1.15	9885433.58
Coho	0		0	1.15	0
Alternative 3			0		0
San Francisco					

Table D-11a. Personal income at the local level - commercial salmon fishery (1988-93 base).					
Alternative 1	7105600		29218227.2		29218227.2
Chinook	7105600	4.112	29218227.2	1	29218227.2
Coho	0		0	1	0
Alternative 2, Option 1	5305300		21815393.6		21815393.6
Chinook	5305300	4.112	21815393.6	1	21815393.6
Coho	0		0	1	0
Alternative 2, Option 2	5305300		21815393.6		21815393.6
Chinook	5305300	4.112	21815393.6	1	21815393.6
Coho	0		0	1	0
Alternative 3	0		0		
Santa Barbara					
Alternative 1	106800		579069.6		608023.08
Chinook	106800	5.422	579069.6	1.05	608023.08
Coho	0		0	1.05	0
Alternative 2, Option 1	79800		432675.6		454309.38
Chinook	79800	5.422	432675.6	1.05	454309.38
Coho	0		0	1.05	0
Alternative 2, Option 2	79800		432675.6		454309.38
Chinook	79,800	5.422	432675.6	1.05	454309.38
Coho	0		0	1.05	0
Alternative 3			0		0
Notes					
All monetary values are reported in constant 1996 dollars.					
State personal income effects are not reported in the Public Draft EIS.					

Table D-11b. Personal income at the local level - commercial salmon fishery (1994-97 base).					
Port/Alternative	HARVEST VALUE	LOCAL INCOME FACTOR	LOCAL INCOME	STATE INCOME COEF	STATE INCOME
Neah Bay					
Alternative 1	115300		351895.6		434591.066
Chinook	115300	3.052	351895.6	1.235	434591.066
Coho	0	1.411	0	1.235	0
Alternative 2, Option 1	105400		321680.8		397275.788
Chinook	105400	3.052	321680.8	1.235	397275.788
Coho	0	1.411	0	1.235	0
Alternative 2, Option 2	56800		173353.6		214091.696
Chinook	56800	3.052	173353.6	1.235	214091.696
Coho	0	1.411	0	1.235	0
Alternative 3			0		0
La Push					
Alternative 1	6100		18617.2		22992.242
Chinook	6100	3.052	18617.2	1.235	22992.242
Coho	0	1.411	0	1.235	0
Alternative 2, Option 1	31900		97358.8		120238.118
Chinook	31900	3.052	97358.8	1.235	120238.118
Coho	0	1.411	0	1.235	0
Alternative 2, Option 2	17200		52494.4		64830.584
Chinook	17200	3.052	52494.4	1.235	64830.584
Coho	0	1.411	0	1.235	0
Alternative 3			0		0
Grays Harbor					
Alternative 1	142200		433994.4		535983.084
Chinook	142200	3.052	433994.4	1.235	535983.084
Coho	0	1.411	0	1.235	0
Alternative 2, Option 1	90900		277426.8		342622.098
Chinook	90900	3.052	277426.8	1.235	342622.098
Coho	0	1.411	0	1.235	0
Alternative 2, Option 2	76700		234088.4		289099.174
Chinook	76700	3.052	234088.4	1.235	289099.174
Coho	0	1.411	0	1.235	0
Alternative 3			0		0
Columbia River-Washington					
Alternative 1	0		0		0
Chinook	0	1.15	0	1.176	0
Coho	0	1.319	0	1.176	0
Alternative 2, Option 1	14820		17043		20042.568
Chinook	14820	1.15	17043	1.176	20042.568
Coho	0	1.319	0	1.176	0
Alternative 2, Option 2	7980		9177		10792.152
Chinook	7980	1.15	9177	1.176	10792.152
Coho	0	1.319	0	1.176	0
Alternative 3			0		0
Columbia River-Oregon					
Alternative 1	0		0		0
Chinook	0	1.15	0	1.176	0

Table D-11b. Personal income at the local level - commercial salmon fishery (1994-97 base).					
Coho	0	1.319	0	1.176	0
Alternative 2, Option 1	9880		11362		13361.712
Chinook	9880	1.15	11362	1.176	13361.712
Coho	0	1.319	0	1.176	0
Alternative 2, Option 2	5320		6118		7194.768
Chinook	5320	1.15	6118	1.176	7194.768
Coho	0	1.319	0	1.176	0
Alternative 3			0		0
Tillamook					
Alternative 1	196200		665902.8		812401.416
Chinook	196200	3.394	665902.8	1.22	812401.416
Coho	0	1.36	0	1.22	0
Alternative 2, Option 1	233000		748088		912667.36
Chinook	212000	3.394	719528	1.22	877824.16
Coho	21000	1.36	28560	1.22	34843.2
Alternative 2, Option 2	230000		741974		905208.28
Chinook	211000	3.394	716134	1.22	873683.48
Coho	19000	1.36	25840	1.22	31524.8
Alternative 3			0		0
Newport					
Alternative 1	833800		2583112.4		3190143.814
Chinook	833800	3.098	2583112.4	1.235	3190143.814
Coho	0	1.36	0	1.235	0
Alternative 2, Option 1	925000		2822200		3485417
Chinook	900000	3.098	2788200	1.235	3443427
Coho	25000	1.36	34000	1.235	41990
Alternative 2, Option 2	921000		2813284		3474405.74
Chinook	898000	3.098	2782004	1.235	3435774.94
Coho	23000	1.36	31280	1.235	38630.8
Alternative 3			0		0
Coos Bay					
Alternative 1	1445400		4567464		5110992.216
Chinook	1445400	3.16	4567464	1.119	5110992.216
Coho	0	1.36	0	1.119	0
Alternative 2, Option 1	1584000		4964040		5554760.76
Chinook	1561000	3.16	4932760	1.119	5519758.44
Coho	23000	1.36	31280	1.119	35002.32
Alternative 2, Option 2	1578000		4948680		5537572.92
Chinook	1557000	3.16	4920120	1.119	5505614.28
Coho	21000	1.36	28560	1.119	31958.64
Alternative 3			0		0
Port/Alternative	HARVEST VALUE	LOCAL INCOME FACTOR	LOCAL INCOME	STATE INCOME COEF	STATE INCOME
Brookings					
Alternative 1	60700		212207.2		262075.892
Chinook	60700	3.496	212207.2	1.235	262075.892
Coho	0		0	1.235	0
Alternative 2, Option 1	107400		375470.4		463705.944
Chinook	107400	3.496	375470.4	1.235	463705.944

Table D-11b. Personal income at the local level - commercial salmon fishery (1994-97 base).					
Coho	0		0	1.235	0
Alternative 2, Option 2	44000		153824		189972.64
Chinook	44000	3.496	153824	1.235	189972.64
Coho	0		0	1.235	0
Alternative 3			0		0
Crescent City					
Alternative 1	25700		98071.2		116704.728
Chinook	25700	3.816	98071.2	1.19	116704.728
Coho	0		0	1.19	0
Alternative 2, Option 1	45400		173246.4		206163.216
Chinook	45400	3.816	173246.4	1.19	206163.216
Coho	0		0	1.19	0
Alternative 2, Option 2	18600		70977.6		84463.344
Chinook	18600	3.816	70977.6	1.19	84463.344
Coho	0		0	1.19	0
Alternative 3			0		0
Eureka					
Alternative 1	80900		311869.5		371124.705
Chinook	80900	3.855	311869.5	1.19	371124.705
Coho	0		0	1.19	0
Alternative 2, Option 1	143300		552421.5		657381.585
Chinook	143300	3.855	552421.5	1.19	657381.585
Coho	0		0	1.19	0
Alternative 2, Option 2	58700		226288.5		269283.315
Chinook	58700	3.855	226288.5	1.19	269283.315
Coho	0		0	1.19	0
Alternative 3			0		0
Fort Bragg					
Alternative 1	3118900		11000360.3		13090428.76
Chinook	3118900	3.527	11000360.3	1.19	13090428.76
Coho	0		0	1.19	0
Alternative 2, Option 1	2212800		7804545.6		9287409.264
Chinook	2212800	3.527	7804545.6	1.19	9287409.264
Coho	0		0	1.19	0
Alternative 2, Option 2	2329300		8215441.1		9776374.909
Chinook	2329300	3.527	8215441.1	1.19	9776374.909
Coho	0		0	1.19	0
Alternative 3			0		0
Monterey					
Alternative 1	3212800		10807859.2		12429038.08
Chinook	3212800	3.364	10807859.2	1.15	12429038.08
Coho	0		0	1.15	0
Alternative 2, Option 1	2279500		7668238		8818473.7
Chinook	2279500	3.364	7668238	1.15	8818473.7
Coho	0		0	1.15	0
Alternative 2, Option 2	2399500		8071918		9282705.7
Chinook	2399500	3.364	8071918	1.15	9282705.7
Coho	0		0	1.15	0
Alternative 3			0		0
San Francisco					

Table D-11b. Personal income at the local level - commercial salmon fishery (1994-97 base).					
Alternative 1	6670400		27428684.8		27428684.8
Chinook	6670400	4.112	27428684.8	1	27428684.8
Coho	0		0	1	0
Alternative 2, Option 1	4732600		19460451.2		19460451.2
Chinook	4732600	4.112	19460451.2	1	19460451.2
Coho	0		0	1	0
Alternative 2, Option 2	4981700		20484750.4		20484750.4
Chinook	4981700	4.112	20484750.4	1	20484750.4
Coho	0		0	1	0
Alternative 3			0		
Santa Barbara					
Alternative 1	100300		543826.6		571017.93
Chinook	100300	5.422	543826.6	1.05	571017.93
Coho	0		0	1.05	0
Alternative 2, Option 1	71200		386046.4		405348.72
Chinook	71200	5.422	386046.4	1.05	405348.72
Coho	0		0	1.05	0
Alternative 2, Option 2	74900		406107.8		426413.19
Chinook	74900	5.422	406107.8	1.05	426413.19
Coho	0		0	1.05	0
Alternative 3			0		0
Notes					
All monetary values are reported in constant 1996 dollars.					
State personal income effects are not reported in the Public Draft EIS.					

0.33 to a high of 0.47. Based on this range, a value of 0.40 was used to estimate the net income generated by the commercial salmon harvest. This net income coefficient was used in the calculations in Tables D-11a and D-11b.

Total Personal Income to Commercial Fishers Trolling for Salmon

Total (direct, indirect, and induced) personal income generated by commercial fishing for salmon was estimated based on personal income multipliers applied to the estimated ex-vessel value of the chinook and coho harvest (Table D-11a and D-11b). Total personal income effects include the impacts on businesses that supply goods and services to commercial fishermen and that buy salmon (i.e., processors), as well as the induced effects in the local economy from spending of the wages and salaries earned. The multipliers were obtained from the Council (Seger, personal communication), which uses them to conduct its annual review of the ocean salmon fisheries. The multipliers were derived from information compiled for the Fishery Economic Assessment Model developed by Shannon Davis and Hans Radtke of The Research Group, and others. As shown in Table D-11a and D-11b, port-specific multipliers were used in the analysis.

It should be noted that state income coefficients provided by the Council were used to estimate total personal income at the state level. The results of this analysis also are

presented in Tables D-11a and D-11b, but are not presented in the FPEIS, as noted in the tables.

D.4.3 Columbia River Basin

The alternatives analyzed for the Columbia River basin assessment are similar to the Pacific Coast assessment: Alternative 3—No Incidental Take and Alternative 2—Live Capture, Selective, and Terminal Fisheries, which has two options. Option A, assumes that the number of fish encounters would increase to take advantage of the opportunity to harvest more hatchery fish, and Option B, which assumes the number of fish encounters would not change from status quo levels. The baseline conditions (i.e., Alternative 1) includes two different historical periods (1988-1993 [Baseline 1] and 1994-1997 [Baseline 2]) as harvest and effort baselines (as modified by current management policies).

The analysis of economic impacts focus on predicted changes in harvest and effort in counties in Washington, Oregon, and Idaho that are adjacent to the Columbia River. Changes in harvest in Zones 1 through 5, which extends from the Pacific Ocean to the Bonneville Dam, and Zone 6, which extends from Bonneville Dam to the McNary Dam, are evaluated.

D.4.3.1 Salmon Sport Fishery

NRC developed estimates of the number of angler days for salmon and steelhead by county of destination in Washington, Oregon, and Idaho for each alternative. Under Alternative 1 for Baselines 1 and 2, the number of angler days was derived using the observed average annual catch divided by the observed average annual catch per unit of effort during each base period. These data were obtained from the Washington Department of Fish and Wildlife, Oregon Department of Fish and Wildlife, and Idaho Fish and Game. Under Alternative 2, Option B, angler effort is the same as under Alternative 1. Under Alternative 2, Option A, the sport catch of hatchery fish predicted by NRC's model was divided by the observed catch per unit of effort during each base period to estimate effort (angler days). Angler days were developed for seven counties and one four-county region in Washington, five counties and one three-county region in Oregon, and three counties and one three-county region in Idaho. Angler days also were identified for other, unspecified counties of destination in Oregon and Washington. This information, which is presented in Tables D-12a and D-12b, was used to quantify the following parameters:

- Net benefits (net willingness to pay) to salmon and steelhead anglers
- Gross and net income to sport fishing-related businesses
- Total (direct, indirect, and induced) personal income at the local (county) level

Net Benefits to Salmon and Steelhead Anglers

The net benefits to ocean salmon anglers, as measured by their net WTP for salmon fishing opportunities, were estimated based on average per angler day values for sport

fishing on the Snake River, as reported by the Corps (1999). An average value of $34 per trip (1996 dollars) was used for sport fishing for salmon and steelhead. This value

Table D-12a. Net income and local personal income for the Columbia River Salmon Sport Fishery (1988-93 base period).

Alternative 1						
WASHINGTON						
	Angler Days	Spending per Day	Total Spending	Net Income Coefficient	Net Income	Local PI Impact
Pacific	107,000	47.88	5123160	0.116	$594,287	$3,349,100
Wahkiakum	31,700	47.88	1517796	0.116	$176,064	$992,210
Cowlitz	217,300	47.88	10404324	0.116	$1,206,902	$6,801,490
Clark	53,300	47.88	2552004	0.116	$296,032	$1,668,290
Lewis	184,500	47.88	8833860	0.116	$1,024,728	$5,774,850
Skamania	24,900	47.88	1192212	0.116	$138,297	$779,370
Klickitat	129,800	47.88	6214824	0.116	$720,920	$4,062,740
Benton/Yakama/Franklin/Chelan	173,100	47.88	8288028	0.116	$961,411	$5,418,030
Other	21,400	47.88	1024632	0.116	$118,857	$669,820
STATE TOTAL	943,000					
OREGON						
Clatsop	109,100	47.88	5223708	0.116	$605,950	$3,414,830
Columbia	48,600	47.88	2326968	0.116	$269,928	$1,521,180
Multnohmah	76,800	47.88	3677184	0.116	$426,553	$2,403,840
Clackamas	295,500	47.88	14148540	0.116	$1,641,231	$9,249,150
Linn	18,600	47.88	890568	0.116	$103,306	$582,180
Hood River/Wasco/Sherman	166,400	47.88	7967232	0.116	$924,199	$5,208,320
Other	128,400	47.88	6147792	0.116	$713,144	$4,018,920
STATE TOTAL	843,400					
IDAHO						
Idaho	32,000	47.88	1532160	0.116	$177,731	$1,001,600
Nez Perce	18,500	47.88	885780	0.116	$102,750	$579,050
Valley	7,200	47.88	344736	0.116	$39,989	$225,360
Lemhi/Custer/Clearwater	14400	47.88	689472	0.116	$79,979	$450,720
STATE TOTAL	72,100					
Alternative 2, Option 1						

Table D-12a. Net income and local personal income for the Columbia River Salmon Sport Fishery (1988-93 base period).

WASHINGTON						
Pacific	93,700	47.88	4486356	0.116	$520,417	$2,932,810
Wahkiakum	29,300	47.88	1402884	0.116	$162,735	$917,090
Cowlitz	199,400	47.88	9547272	0.116	$1,107,484	$6,241,220
Clark	53,300	47.88	2552004	0.116	$296,032	$1,668,290
Lewis	172900	47.88	8278452	0.116	$960,300	$5,411,770
Skamania	24900	47.88	1192212	0.116	$138,297	$779,370
Klickitat	123900	47.88	5932332	0.116	$688,151	$3,878,070
Benton/Yakama/Franklin/Chelan	168,700	47.88	8077356	0.116	$936,973	$5,280,310
Other	76,900	47.88	3681972	0.116	$427,109	$2,406,970
STATE TOTAL	943,000					
OREGON						
Clatsop	95600	47.88	4577328	0.116	$530,970	$2,992,280
Columbia	42700	47.88	2044476	0.116	$237,159	$1,336,510
Multnohmah	68600	47.88	3284568	0.116	$381,010	$2,147,180
Clackamas	255500	47.88	12233340	0.116	$1,419,067	$7,997,150
Linn	18600	47.88	890568	0.116	$103,306	$582,180
Hood River/Wasco/Sherman	164200	47.88	7861896	0.116	$911,980	$5,139,460
Other	198200	47.88	9489816	0.116	$1,100,819	$6,203,660
STATE TOTAL	843400				$0	$26,398,420
IDAHO						
Idaho	32000	47.88	1532160	0.116	$177,731	$1,001,600
Nez Perce	18500	47.88	885780	0.116	$102,750	$579,050
Valley	7200	47.88	344736	0.116	$39,989	$225,360
Lemhi/Custer/Clearwater	14400	47.88	689472	0.116	$79,979	$450,720
STATE TOTAL	72100	47.88				
Alternative 2, Option 2						
WASHINGTON						
Pacific	153900	47.88	7368732	0.116	$854,773	$4,817,070
Wahkiakum	39800	47.88	1905624	0.116	$221,052	$1,245,740
Cowlitz	275600	47.88	13195728	0.116	$1,530,704	$8,626,280
Clark	53300	47.88	2552004	0.116	$296,032	$1,668,290
Lewis	222400	47.88	10648512	0.116	$1,235,227	$6,961,120
Skamania	24900	47.88	1192212	0.116	$138,297	$779,370
Klickitat	160600	47.88	7689528	0.116	$891,985	$5,026,780

Table D-12a. Net income and local personal income for the Columbia River Salmon Sport Fishery (1988-93 base period).						
Benton/Yakama/Franklin/Chelan	205000	47.88	9815400	0.116	$1,138,586	$6,416,500
Other	31700	47.88	1517796	0.116	$176,064	$992,210
STATE TOTAL	1167200					
OREGON						
Clatsop	129600	47.88	6205248	0.116	$719,809	$4,056,480
Columbia	51000	47.88	2441880	0.116	$283,258	$1,596,300
Multnohmah	80100	47.88	3835188	0.116	$444,882	$2,507,130
Clackamas	311700	47.88	14924196	0.116	$1,731,207	$9,756,210
Linn	18600	47.88	890568	0.116	$103,306	$582,180
Hood River/Wasco/Sherman	185000	47.88	8857800	0.116	$1,027,505	$5,790,500
Other	212200	47.88	10160136	0.116	$1,178,576	$6,641,860
STATE TOTAL	988200					
IDAHO						
Idaho	36500	47.88	1747620	0.116	$202,724	$1,142,450
Nez Perce	21100	47.88	1010268	0.116	$117,191	$660,430
Valley	8200	47.88	392616	0.116	$45,543	$256,660
Lemhi/Custer/Clearwater	16400	47.88	785232	0.116	$91,087	$513,320
STATE TOTAL	82200					
Notes						
All monetary values are reported in constant 1996 dollars.						

Table D-12b. Net income and local personal income for the Columbia River Salmon Sport Fishery (1994-97 base period).

Alternative 1						
WASHINGTON						
	Angler Days	Spending per Day	Total Spending	Net Income Coefficient	Net Income	Local PI Impact
Pacific	30,000	47.88	1436400	0.116	$166,622	$939,000
Wahkiakum	13,900	47.88	665532	0.116	$77,202	$435,070
Cowlitz	100,800	47.88	4826304	0.116	$559,851	$3,155,040
Clark	27,100	47.88	1297548	0.116	$150,516	$848,230
Lewis	87,200	47.88	4175136	0.116	$484,316	$2,729,360
Skamania	12,700	47.88	608076	0.116	$70,537	$397,510
Klickitat	61,800	47.88	2958984	0.116	$343,242	$1,934,340
Benton/Yakama/Franklin/ Chelan	83,900	47.88	4017132	0.116	$465,987	$2,626,070
Other	9,400	47.88	450072	0.116	$52,208	$294,220
STATE TOTAL	426,800					
OREGON						
Clatsop	31,900	47.88	1527372	0.116	$177,175	$998,470
Columbia	17,000	47.88	813960	0.116	$94,419	$532,100
Multnohmah	28,500	47.88	1364580	0.116	$158,291	$892,050
Clackamas	98,300	47.88	4706604	0.116	$545,966	$3,076,790
Linn	9,500	47.88	454860	0.116	$52,764	$297,350
Hood River/Wasco/Sherman	79,800	47.88	3820824	0.116	$443,216	$2,497,740
Other	49,700	47.88	2379636	0.116	$276,038	$1,555,610
STATE TOTAL	314,700					
IDAHO						
Idaho	20,700	47.88	991116	0.116	$114,969	$647,910
Nez Perce	12,000	47.88	574560	0.116	$66,649	$375,600
Valley	4,700	47.88	225036	0.116	$26,104	$147,110
Lemhi/Custer/Clearwater	9300	47.88	445284	0.116	$51,653	$291,090
STATE TOTAL	46,700					$1,461,710
Alternative 2						
WASHINGTON						
Pacific	27,100	47.88	1297548	0.116	$150,516	$848,230

Table D-12b. Net income and local personal income for the Columbia River Salmon Sport Fishery (1994-97 base period).

Wahkiakum	13,500	47.88	646380	0.116	$74,980	$422,550
Cowlitz	97,900	47.88	4687452	0.116	$543,744	$3,064,270
Clark	27,100	47.88	1297548	0.116	$150,516	$848,230
Lewis	85300	47.88	4084164	0.116	$473,763	$2,669,890
Skamania	12700	47.88	608076	0.116	$70,537	$397,510
Klickitat	60900	47.88	2915892	0.116	$338,243	$1,906,170
Benton/Yakama/Franklin/ Chelan	83,200	47.88	3983616	0.116	$462,099	$2,604,160
Other	19,100	47.88	914508	0.116	$106,083	$597,830
STATE TOTAL						
OREGON						
Clatsop	28700	47.88	1374156	0.116	$159,402	$898,310
Columbia	15600	47.88	746928	0.116	$86,644	$488,280
Multnohmah	26600	47.88	1273608	0.116	$147,739	$832,580
Clackamas	88900	47.88	4256532	0.116	$493,758	$2,782,570
Linn	9500	47.88	454860	0.116	$52,764	$297,350
Hood River/Wasco/Sherman	79300	47.88	3796884	0.116	$440,439	$2,482,090
Other	66100	47.88	3164868	0.116	$367,125	$2,068,930
STATE TOTAL					$0	
IDAHO						
Idaho	20700	47.88	991116	0.116	$114,969	$647,910
Nez Perce	12000	47.88	574560	0.116	$66,649	$375,600
Valley	4700	47.88	225036	0.116	$26,104	$147,110
Lemhi/Custer/Clearwater	9300	47.88	445284	0.116	$51,653	$291,090
STATE TOTAL		47.88				
Alternative 2, Option 2						
WASHINGTON						
Pacific	62800	47.88	3006864	0.116	$348,796	$1,965,640
Wahkiakum	21800	47.88	1043784	0.116	$121,079	$682,340
Cowlitz	164600	47.88	7881048	0.116	$914,202	$5,151,980
Clark	27100	47.88	1297548	0.116	$150,516	$848,230
Lewis	128300	47.88	6143004	0.116	$712,588	$4,015,790
Skamania	12700	47.88	608076	0.116	$70,537	$397,510
Klickitat	113900	47.88	5453532	0.116	$632,610	$3,565,070
Benton/Yakama/Franklin/	145900	47.88	6985692	0.116	$810,340	$4,566,670

Table D-12b. Net income and local personal income for the Columbia River Salmon Sport Fishery (1994-97 base period).						
Chelan						
Other	22200	47.88	1062936	0.116	$123,301	$694,860
STATE TOTAL						
OREGON						
Clatsop	52900	47.88	2532852	0.116	$293,811	$1,655,770
Columbia	25400	47.88	1216152	0.116	$141,074	$795,020
Multnohmah	40100	47.88	1919988	0.116	$222,719	$1,255,130
Clackamas	155200	47.88	7430976	0.116	$861,993	$4,857,760
Linn	9500	47.88	454860	0.116	$52,764	$297,350
Hood River/Wasco/Sherman	128800	47.88	6166944	0.116	$715,366	$4,031,440
Other	79200	47.88	3792096	0.116	$439,883	$2,478,960
STATE TOTAL						
IDAHO						
Idaho	34100	47.88	1632708	0.116	$189,394	$1,067,330
Nez Perce	19700	47.88	943236	0.116	$109,415	$616,610
Valley	7700	47.88	368676	0.116	$42,766	$241,010
Lemhi/Custer/Clearwater	15400	47.88	737352	0.116	$85,533	$482,020
STATE TOTAL						
Notes						
All monetary values are reported in constant 1996 dollars.						

was derived by deflating the 1998 value described in the report using the consumer price index for the Pacific Coast.

Gross and Net Income to Sport Fishing-Related Businesses

Gross income to sport fishing-related businesses was approximated based on angler expenditures on sport fishing for salmon, which were estimated based on information from The Research Group (1991) on sport fishing activity in Oregon. An average value ($38.26) was derived from spending profiles for resident anglers ($43.40) and nonresident anglers ($33.12) for sport fishing for salmon in the Columbia River. This 1989 value was converted to 1996 dollars using the consumer price index for the Pacific Coast (1.2516) to obtain the $47.88 value shown in Tables D-12a and D-12b.

The spending profiles per angler day were used with the number of predicted angler days provided by NRC to estimate total spending associated with sport fishing for salmon (Tables D-12a and D-12b). The net income to affected sport fishing-related

businesses was estimated based on a net income coefficient derived from data on proprietary income in the 1992 IMPLAN data base for Clatsop County, Oregon. A weighted average was estimated from five sport fishing-related sectors: food stores, eating and drinking establishments, service stations and fuel, hotels and motels, and miscellaneous retail trade. The relative amount of angler spending in these sectors, based on information reported by the U.S. Fish and Wildlife Service (1999) was used to weight the percentages for each sector. The resulting coefficient (11.6 percent) was applied to sport fishing-related revenues to estimate net income to affected businesses. These calculations are shown in Tables D-12a (1988-93 base) and C-12b (1994-97 base).

Total Personal Income at the County Level from Salmon and Steelhead Sport Fishing

Total (direct, indirect, and induced) personal income generated by angler spending was estimated based on a personal income multiplier applied to the predicted number of angler days for salmon and steelhead. A multiplier of $31.30 per anger day was derived from information by The Research Group (1991) on angler activity and related economics in Oregon. The results of using this multiplier are shown in Table D-12a and D-12b.

It should be noted that the analytical procedures used to estimate total personal income effects do not differentiate between spending by resident and nonresident anglers. From a local or regional economic impact perspective, this distinction is important because spending by anglers who live outside the region of interest represents "new" income to the region, whereas spending by residents of the region is primarily income that is re-directed from other activities within the region. This distinction could not be accurately accounted for in the analysis because of limited data on the relative proportion of resident and nonresident anglers and on spending patterns of resident anglers. The impact on the analysis of not accounting for this effect is that the estimates of changes in direct personal income are overstated, probably by 20 percent to 30 percent.

D.4.3.2 Commercial Salmon Fishery

NRC developed estimates of the number of fish harvested in the chinook, coho, and chum/sockeye fishery along the Columbia River based on observed data for Baselines 1and 2. These data were used to characterize harvest under Alternative 1. For Alternative 2, Option A, status quo harvest levels were adjusted to fully utilize hatchery stocks (i.e., harvest as much of the hatchery stocks while still meeting hatchery escapement goals). For Alternative 2, Option B, harvest levels under Alternative 1 were adjusted to reflect the proportion of wild fish that would have to be released to meet the Incidental Take requirements (Alternative 1). Based on anecdotal information from the Oregon Department of Fish & Wildlife, the estimates of harvest were then allocated to different ports. Modeling results were used to quantify the following parameters:

- Ex-vessel value by county

- Net income (profits) to commercial salmon fishers, by county
- Total (direct, indirect, and induced) personal income at the local (county) level

Ex-Vessel Value

The harvest of chinook, coho, and chum/sockeye salmon provided by NRC during the two base periods (1988-1993 and 1994-1997) by port was combined at the county level (Table D-13). The ex-vessel value of the harvest was then calculated based on average prices per pound, which were derived from 1997 Council data (Table IV-9) for the non-American Indian/Alaska Native gillnet for the Oregon side of the Columbia River. The average price per pound for chinook ($0.98) is a weighted average of the price for spring chinook ($2.62 per pound) and fall chinook ($0.80 per pound). The proportions used for weighting were 12.1 percent for spring chinook and 87.9 percent for fall chinook, which reflect the relative proportion of the chinook salmon harvest projected by NRC for Alternative 1. The average price per pound for coho ($0.74) reported by Council (1998) was used to value both the coho and chum/sockeye harvest. The total ex-vessel value of salmon harvested is shown by county in Table D-13.

Net Income to Commercial Salmon Fishers

The net income (profits) to commercial salmon fishers was estimated based on a net income coefficient derived from the 1992 IMPLAN database. Information on proprietary income in the commercial fishing sector (all species) was reviewed for different west coast regions extending from Monterey, California, to the Oregon/Washington boundary. Proprietary income, as a percentage of direct income, ranged from a low of 0.33 to a high of 0.47. Based on this range, a value of 0.40 was used to estimate the net income generated to commercial salmon fishers.

Total Personal Income to Commercial Fishers Trolling for Salmon

Total (direct, indirect, and induced) personal income generated by commercial fishing for salmon at the local (county) level was estimated based on personal income multipliers. These multipliers were obtained from the Council (Seger, personal communication), which uses them to conduct its annual review of the ocean salmon fisheries. The multipliers were derived from information compiled for the Fishery Economic Assessment Model developed by Shannon Davis and Hans Radtke of The Research Group. Separate multipliers for chinook (1.15) and coho (1.319) were applied to the estimated ex-vessel value of the chinook and coho harvest to estimate local personal income effects (Table D-13).

Table D-13. Worksheet for allocating the Columbia River commercial salmon harvest by county.

1988-93 Period																	
ZONE1-5: Alternative 1																	
			Allocation by Species			Pounds			Ex-Vessel Value					Local Personal Income			
Counties	% Allocation	Commercial Harvest (fish)	Chinook	Coho	Chum/Sockeye	Chinook	Coho	Chum/Sockeye	Chinook	Coho	Chum/Sockeye	TOTAL		Chinook	Coho	Chum/Sockeye	TOTAL
WA													WA				
Pacific	0.375	120038	36450	83175	450	371790	399240	2160	$364,354	$295,438	$1,598	$661,390	Pacific	$419,007	$389,682	$1,838	$810,528
Wahkiakum	0.05	16005	4860	11090	60	49572	53232	288	$48,581	$39,392	$213	$88,185	Wahkiakum	$55,868	$51,958	$245	$108,070
Clark	0.025	8002.5	2430	5545	30	24786	26616	144	$24,290	$19,696	$107	$44,093	Clark	$27,934	$25,979	$123	$54,035
Cowlitz	0.05	16005	4860	11090	60	49572	53232	288	$48,581	$39,392	$213	$88,185	Cowlitz	$55,868	$51,958	$245	$108,070
OR												$0	OR				
Clatsop	0.375	120038	36450	83175	450	371790	399240	2160	$364,354	$295,438	$1,598	$661,390	Clatsop	$419,007	$389,682	$1,838	$810,528
Columbia	0.1	32010	9720	22180	120	99144	106464	576	$97,161	$78,783	$426	$176,371	Columbia	$111,735	$103,915	$490	$216,141
Multnomah	0.025	8002.5	2430	5545	30	24786	26616	144	$24,290	$19,696	$107	$44,093	Multnomah	$27,934	$25,979	$123	$54,035
TOTAL	1	320100	97200	221800	1200	991440	1064640	5760	$971,611	$787,834	$4,262	$1,763,707	TOTAL	$1,117,353	$1,039,153	$4,902	$2,161,407
		320100	97200	221800	1200												
1994-97 Base Period																	
ZONE1-5: Alternative 1																	
			Allocation by Species			Pounds			Ex-Vessel Value					Local Personal Income			
ZONE1-5: Alternative 1																	
			Allocation by Species			Pounds			Ex-Vessel Value					Local Personal Income			
Counties	% Allocation	Commercial Harvest (fish)	Chinook	Coho	Chum/Sockeye	Chinook	Coho	Chum/Sockeye	Chinook	Coho	Chum/Sockeye	TOTAL		Chinook	Coho	Chum/Sockeye	TOTAL
WA													WA				
Pacific	0.375	15975	3412.5	12562.5	0	34808	60300	0	$34,111	$44,622	$0	$78,733	Pacific	$39,228	$58,856	$0	$98,084
Wahkiakum	0.05	2130	455	1675	0	4641	8040	0	$4,548	$5,950	$0	$10,498	Wahkiakum	$5,230	$7,848	$0	$13,078
Clark	0.025	1065	227.5	837.5	0	2320.5	4020	0	$2,274	$2,975	$0	$5,249	Clark	$2,615	$3,924	$0	$6,539
Cowlitz	0.05	2130	455	1675	0	4641	8040	0	$4,548	$5,950	$0	$10,498	Cowlitz	$5,230	$7,848	$0	$13,078
OR												$0	OR				
Clatsop	0.375	15975	3412.5	12562.5	0	34808	60300	0	$34,111	$44,622	$0	$78,733	Clatsop	$39,228	$58,856	$0	$98,084
Columbia	0.1	4260	910	3350	0	9282	16080	0	$9,096	$11,899	$0	$20,996	Columbia	$10,461	$15,695	$0	$26,156
Multnomah	0.025	1065	227.5	837.5	0	2320.5	4020	0	$2,274	$2,975	$0	$5,249	Multnomah	$2,615	$3,924	$0	$6,539
TOTAL	1	42600	9100	33500	0	92820	160800	0	$90,964	$118,992	$0	$209,956	TOTAL	$104,608	$156,950	$0	$261,559
		42600	9100	33500	0												
88-93 Period																	
ZONE1-5: Alternative 1																	
			Allocation by Species			Pounds			Ex-Vessel Value					Local Personal Income			

Appendix D

Table D-13. Worksheet for allocating the Columbia River commercial salmon harvest by county.

Counties	% Allocation	Commercial Harvest (fish)	Chinook	Coho	Chum/Sockeye	Chinook	Coho	Chum/Sockeye	Chinook	Coho	Chum/Sockeye	TOTAL		Chinook	Coho	Chum/Sockeye	TOTAL
WA													WA	Chinook	Coho	Chum/Sockeye	TOTAL
Pacific	0.375	98700	23850	74850	0	243270	359280	0	$238,405	$265,867	$0	$504,272	Pacific	$274,165	$350,679	$0	$624,844
Wahkiakum	0.05	13160	3180	9980	0	32436	47904	0	$31,787	$35,449	$0	$67,236	Wahkiakum	$36,555	$46,757	$0	$83,313
Clark	0.025	6580	1590	4990	0	16218	23952	0	$15,894	$17,724	$0	$33,618	Clark	$18,278	$23,379	$0	$41,656
Cowlitz	0.05	13160	3180	9980	0	32436	47904	0	$31,787	$35,449	$0	$67,236	Cowlitz	$36,555	$46,757	$0	$83,313
OR												$0	OR				
Clatsop	0.375	98700	23850	74850	0	243270	359280	0	$238,405	$265,867	$0	$504,272	Clatsop	$274,165	$350,679	$0	$624,844
Columbia	0.1	26320	6360	19960	0	64872	95808	0	$63,575	$70,898	$0	$134,472	Columbia	$73,111	$93,514	$0	$166,625
Multnomah	0.025	6580	1590	4990	0	16218	23952	0	$15,894	$17,724	$0	$33,618	Multnomah	$18,278	$23,379	$0	$41,656
TOTAL	1	263200	63600	199600	0	648720	958080	0	$635,746	$708,979	$0	$1,344,725	TOTAL	$731,107	$935,144	$0	$1,666,251
		263200	63600	199600	0												
1994-97 Base Period																	
ZONE1-5: Alternative 1																	
			Allocation by Species			Pounds			Ex-Vessel Value					Local Personal Income			
Counties	% Allocation	Commercial Harvest (fish)	Chinook	Coho	Chum/Sockeye	Chinook	Coho	Chum/Sockeye	Chinook	Coho	Chum/Sockeye	TOTAL		Chinook	Coho	Chum/Sockeye	TOTAL
WA													WA				
Pacific	0.375	13650	2325	11325	0	23715	54360	0	$23,241	$40,226	$0	$63,467	Pacific	$26,727	$53,059	$0	$79,785
Wahkiakum	0.05	1820	310	1510	0	3162	7248	0	$3,099	$5,364	$0	$8,462	Wahkiakum	$3,564	$7,074	$0	$10,638
Clark	0.025	910	155	755	0	1581	3624	0	$1,549	$2,682	$0	$4,231	Clark	$1,782	$3,537	$0	$5,319
Cowlitz	0.05	1820	310	1510	0	3162	7248	0	$3,099	$5,364	$0	$8,462	Cowlitz	$3,564	$7,074	$0	$10,638
OR			0									$0	OR				
Clatsop	0.375	13650	2325	11325	0	23715	54360	0	$23,241	$40,226	$0	$63,467	Clatsop	$26,727	$53,059	$0	$79,785
Columbia	0.1	3640	620	3020	0	6324	14496	0	$6,198	$10,727	$0	$16,925	Columbia	$7,127	$14,149	$0	$21,276
Multnomah	0.025	910	155	755	0	1581	3624	0	$1,549	$2,682	$0	$4,231	Multnomah	$1,782	$3,537	$0	$5,319
TOTAL	1	36400	6200	30200	0	63240	144960	0	$61,975	$107,270	$0	$169,246	TOTAL	$71,271	$141,490	$0	$212,761
		36400	6200	30200	0												
88-93 Base Period																	
ZONE1-5: Alternative 2																	
			Allocation by Species			Pounds			Ex-Vessel Value					Local Personal Income			
Counties	% Allocation	Commercial Harvest (fish)	Chinook	Coho	Chum/Sockeye	Chinook	Coho	Chum/Sockeye	Chinook	Coho	Chum/Sockeye	TOTAL		Chinook	Coho	Chum/Sockeye	TOTAL
WA													WA				

Appendix D

Table D-13. Worksheet for allocating the Columbia River commercial salmon harvest by county.

Pacific	0.375	127238	24750	102488	0	252450	491940	0	$247,401	$364,036	$0	$611,437	Pacific	$284,511	$480,163	$0	$764,674
Wahkiakum	0.05	16965	3300	13665	0	33660	65592	0	$32,987	$48,538	$0	$81,525	Wahkiakum	$37,935	$64,022	$0	$101,957
Clark	0.025	8482.5	1650	6832.5	0	16830	32796	0	$16,493	$24,269	$0	$40,762	Clark	$18,967	$32,011	$0	$50,978
Cowlitz	0.05	16965	3300	13665	0	33660	65592	0	$32,987	$48,538	$0	$81,525	Cowlitz	$37,935	$64,022	$0	$101,957
OR												$0	OR				$0
Clatsop	0.375	127238	24750	102488	0	252450	491940	0	$247,401	$364,036	$0	$611,437	Clatsop	$284,511	$480,163	$0	$764,674
Columbia	0.1	33930	6600	27330	0	67320	131184	0	$65,974	$97,076	$0	$163,050	Columbia	$75,870	$128,043	$0	$203,913
Multnomah	0.025	8482.5	1650	6832.5	0	16830	32796	0	$16,493	$24,269	$0	$40,762	Multnomah	$18,967	$32,011	$0	$50,978
TOTAL	1	339300	66000	273300	0	673200	1311840	0	$659,736	$970,762	$0	$1,630,498	TOTAL	$758,696	$1,280,435	$0	$2,039,131
		339300	66000	273300	0												
1994-97 Base Period																	
ZONE1-5: Alternative 2																	
			Allocation by Species			Pounds			Ex-Vessel Value					Local Personal Income			
Counties	% Allocation	Commercial Harvest (fish)	Chinook	Coho	Chum/Sockeye	Chinook	Coho	Chum/Sockeye	Chinook	Coho	Chum/Sockeye	TOTAL		Chinook	Coho	Chum/Sockeye	TOTAL
WA													WA				
Pacific	0.375	22050	2437.5	19612.5	0	24863	94140	0	$24,365	$69,664	$0	$94,029	Pacific	$28,020	$91,886	$0	$119,906
Wahkiakum	0.05	2940	325	2615	0	3315	12552	0	$3,249	$9,288	$0	$12,537	Wahkiakum	$3,736	$12,252	$0	$15,988
Clark	0.025	1470	162.5	1307.5	0	1657.5	6276	0	$1,624	$4,644	$0	$6,269	Clark	$1,868	$6,126	$0	$7,994
Cowlitz	0.05	2940	325	2615	0	3315	12552	0	$3,249	$9,288	$0	$12,537	Cowlitz	$3,736	$12,252	$0	$15,988
OR												$0	OR				
Clatsop	0.375	22050	2437.5	19612.5	0	24863	94140	0	$24,365	$69,664	$0	$94,029	Clatsop	$28,020	$91,886	$0	$119,906
Columbia	0.1	5880	650	5230	0	6630	25104	0	$6,497	$18,577	$0	$25,074	Columbia	$7,472	$24,503	$0	$31,975
Multnomah	0.025	1470	162.5	1307.5	0	1657.5	6276	0	$1,624	$4,644	$0	$6,269	Multnomah	$1,868	$6,126	$0	$7,994
TOTAL	1	58800	6500	52300	0	66300	251040	0	$64,974	$185,770	$0	$250,744	TOTAL	$74,720	$245,030	$0	$319,750
		58800	6500	52300	0												
Pounds based on average pounds per fish over 5-year period for chinook (1993-97) and for coho 89-93 as reported by PFMC																	
Pounds for Chum based on average pounds per fish for Coho																	
Ex-vessel value based on average price per pound, as reported by PFMC for 1997 and deflated to 1996 $$$; average price per pound for Chinook is a weighted average for Spring and Fall Chinook																	

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D.5 References Cited

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